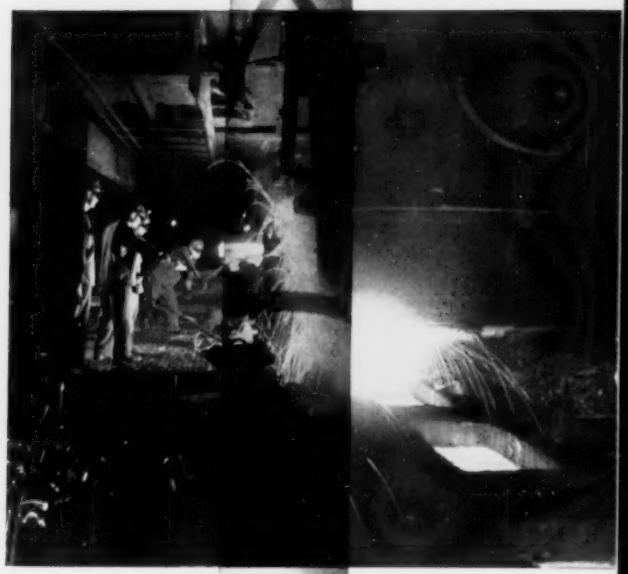
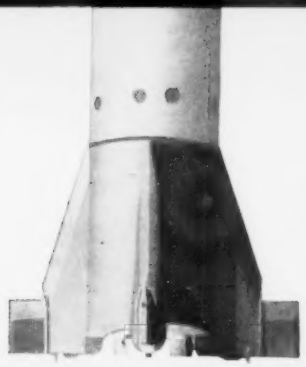
APRIL, 1958

American Engineer

Mr. LaPierre





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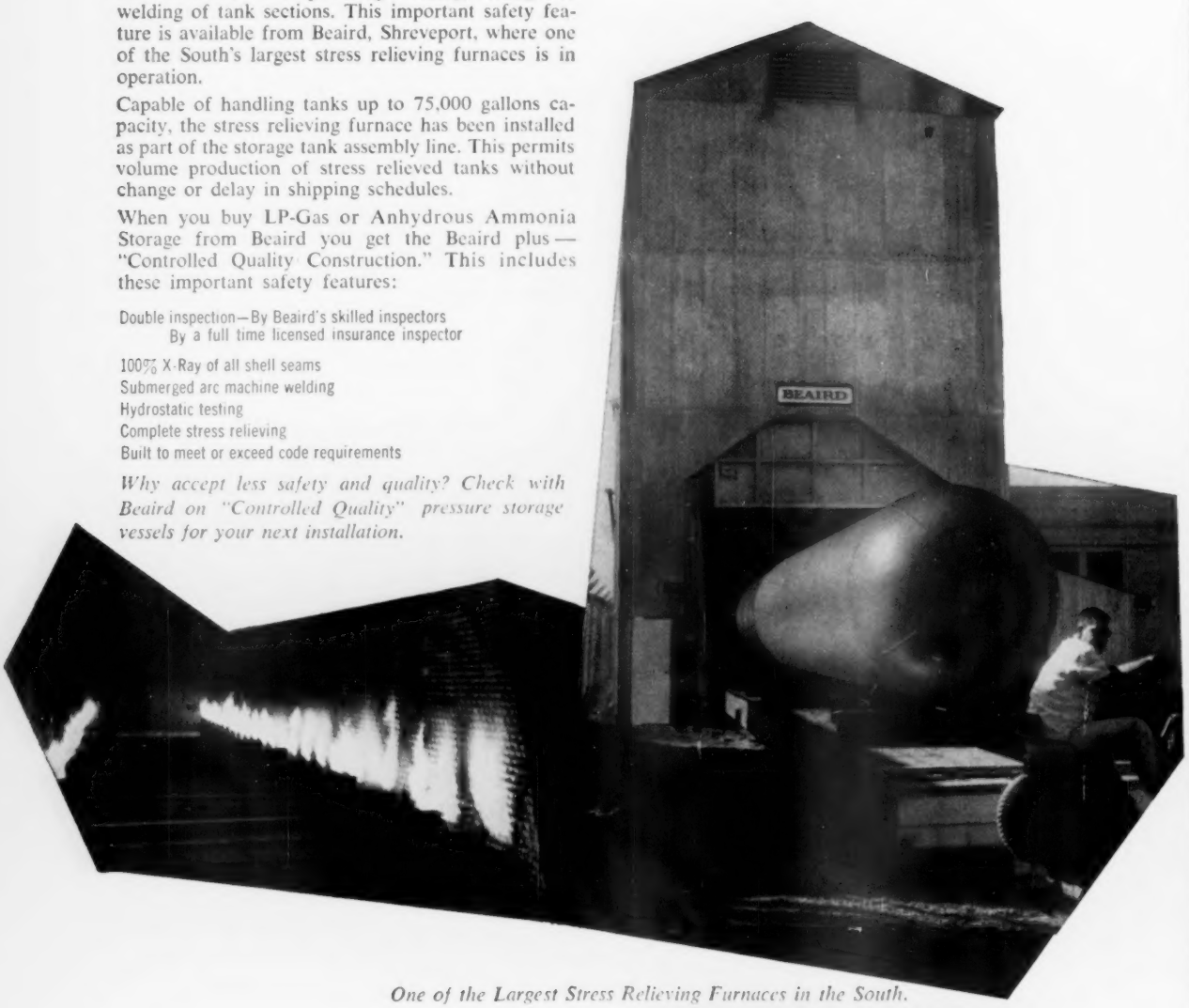

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(Circle 1 on Inside Back Cover)

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Mistake, error, is the discipline through which we advance.

—*Channing*

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The American Engineer is published monthly by the National Society of Professional Engineers, 2029 K St., N.W., Washington 6, D. C., and printed by the National Publishing Company, Washington, D. C. Entered as Second Class Matter at the Post Office, Washington, D. C., under act of March 3, 1879. Copyright, 1958, by the National Society of Professional Engineers. Not responsible for opinions expressed in signed articles. Subscription Rates: $2 per year in advance to member of NSPE and its Affiliated Societies; $3 per year in advance to non-members in U. S. A. and its possessions, Canada and Mexico. Foreign, $4 per year. Single copy, 35c. Vol. 28, No. 4.

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Letters to the Editor

PEs and Private Enterprise . . .

Dear Editor:

In the February issue of the AMERICAN ENGINEER, a NSPE member in a Letter To the Editor criticized the Board severely for taking action in the matter of public *vs.* private ownership of utilities.

Many engineers are greatly interested in whether American industry is going to develop along the line of private ownership (subject to laws and commission regulation), or along the line of public ownership (with political control). The fact that some political parties and some public officials have taken sides in this issue has nothing to do with whether or not the question is of interest to engineers. I submit that this issue is of interest to engineers, and vitally concerns our future working conditions and that the Board has the right and duty to take action in behalf of the members. Based on the present percentages of public and private power capacity and on the employment classifications of the major engineering societies (including NSPE), it is a fair estimate that over three-fourths of the utility engineers in this country are working for private utilities and most of them deliberately chose private rather than public employment.

Certainly engineers should have a right to work for either private or public business and to advocate either. In this case, it would seem that the Board was governed by the majority of opinion, as is proper. The minority presented their viewpoint and lost.

The critic of the Board omits any reference to the fact that the utility which wants to develop Hells Canyon is subject to state and Federal regulation on service and rates, so it is not an uncontrolled monopoly. It is a matter of record that the profits of such companies are considerably less than that of non-utility businesses, and that their so-called profits are nothing but reasonable interest on money legitimately invested in the enterprise.

There is no Federal power system in this country which develops a power source "for the benefit of all the people." Federal power agencies operate under the "preference clause" which offers municipal, state, and co-op consumers first right to power produced. Federal systems pay less taxes and interest, dip into the public treasury to cover these shortages, and permit sales at less than actual cost to the Government. All the people participate in the cost but not in the use of Federal public power.

It is difficult to follow the reasoning that co-ops should be given special privileges. Supposing the telephone company were to insist tomorrow that every customer buy enough shares of telephone stock for his annual dividends to equal his annual telephone bill, so that the company would be owned entirely by its customers. Why should this new status give the telephone system tax exemption? It still needs police and fire protection, and national defense, and its obligation to pay for previous wars is still valid.

As a result of forty years personal experience in the utility industry, dealing with both public and private systems, two things stand out in my mind:

1. Most officials and employees of private systems are willing to see public systems continue, provided they pay the same interest and taxes, and are subject to the same financing and accounting regulations as private power systems.

2. Many of the top people in the public power agencies continually attack privately owned utilities and are apparently trying to put them out of business.

The critic of the Board condemns the *ethics* of the Board, but we who know some of them believe them to be public-spirited, honest, and fair. What is unethical in following the majority opinion on an economic and social issue? It is useless to question the *motives* of the Board because no one knows the motives of another person—except that person and the Lord Almighty.

E. E. George, P. E.
Little Rock, Ark.

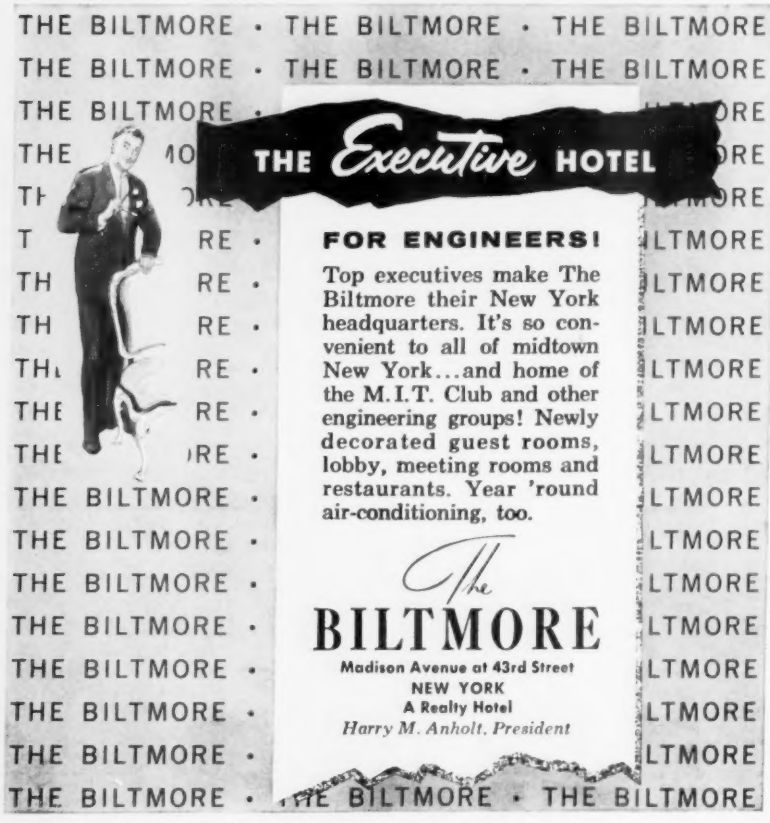
Beyond Coover Plan? . . .

Dear Editor:

There is a growing awareness of the need for professional unity among engineers of all types. This has been manifested in widespread comment about the "AIEE Unity Plan." This program also known as the "Coover Plan" has gained support in other technical societies and might well be adopted. I fear that we have been looking at any "Unity Plan" from the narrow confines of our pet society and in so doing are not striking at the heart of the problem.

Is not our problem that of obtaining professional stature in the eyes of the general public? If so, our solution must lie in how the layman thinks about us, not in how easily we can confederate. The present lack of unity must surely evince great confusion in the eyes of the layman. Will a confederation present a clearer picture? I doubt it. What is required? The following is offered as being an organization which the layman can understand and which will bring the professional attainments to the foreground.

1. The National Society of Professional Engineers will serve as the gov-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erning body for all engineering groups of societies. The NSPE will be responsible for policing the ethical behavior of the member societies and be particularly concerned with promoting professionalism among all engineers. The NSPE shall be the public spokesman for all engineers.

2. The Engineers' Joint Council (EJC) shall act as the governing body for the member societies for all joint activities involving technical or governmental functions. This council shall be under the permanent chairmanship of the NSPE.

3. The Engineers' Council for Professional Development shall work under the direct supervision of the NSPE toward attainment of professionalism among engineers. The ECPD will also work toward improvement in engineering education both in schools and in industry.

4. Member Technical Societies, ASME, AIEE, etc., shall continue to act as independent technical societies within the scope of their own field.

By going a step beyond the "Coover Plan" we arrive at the organization which the general public would expect. This organization would appear somewhat like a corporation to the layman with the NSPE assuming the position of top management in his eyes. Top management cannot speak for each individual worker but it does speak for the group at large and so the general public can understand the NSPE speaking for all engineers even though made up of relatively few.

Let us not stop half-way to our objective and re-group for another attempt at professional unity among engineers. Let us go all the way now.

H. William Mitchell, P.E.
Lititz, Pa.

Hells Canyon . . .

Dear Editor:

In the February issue is a letter titled "Hells Canyon" by Mr. Howard A. Berry, of Carthage, Mo.

It criticizes the NSPE Annual Report's article, "Legislation and Ethics," in regard to Hells Canyon, and the answer by the editor seems a bit like a pacifist apology.

The NSPE has nothing to apologize for, but on the contrary, deserves great commendation.

Mr. Berry's letter clearly indicates he is a proponent of *public* power as against *private* power, by his words: "exploitation of our natural resources at Hells Canyon by a *private profit-taking monopoly instead of full development for the benefit of all the people*". (Italics ours.)

I fear Mr. Berry does not understand the aims of the NSPE. Mr. L. E. Peterson, past chairman of International Relations Committee of the NSPE several years ago stated these words in his address at Mexico City: "Our fundamental legislative policy must be that the public good must come ahead of the

(Continued on page 48)

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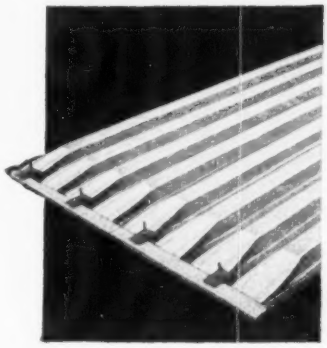

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(Circle 3 on Inside Back Cover)

PROFESSIONAL NEWS IN CAPSULE FORM

A Roundup of Late Events for Professional Engineers

ACE Day is Scheduled At Ohio State, May 2

The fifth annual conference for engineers and architects—known as ACE Day—sponsored by the Ohio State University College of Engineering, is scheduled for Friday, May 2, on the campus at Columbus.

Principal speakers, announced by Engineering Dean Gordon B. Carson, NSPE member and conference director, will be Major General John B. Medaris, commanding general of the U. S. Army Ordnance Corps' Ballistic Missile Agency at Huntsville, Ala.; and James C. Zeder, vice president, engineering, and special adviser to the president of Chrysler Corporation, Detroit.

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Dr. Ovid W. Eshbach Dies in Illinois

Dr. Ovid W. Eshbach, president-elect of Tau Beta Pi and member of NSPE, died in March apparently of a heart attack at Evanston, Ill. He was sixty-five years of age.

Tau Beta Pi is a national engineering honor society.

Dr. Eshbach was the first dean of Northwestern University's Technological Institute. At one time he was on the faculty of Lehigh University, the Massachusetts Institute of Technology, and Brooklyn Polytechnical Institute.

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Dr. Schoenherr Named Laboratory Director

The Navy Department has announced the selection of Dr. Karl E. Schoenherr, noted naval architect and educator, to be technical director of the Hydromechanics Laboratory at the David Taylor Model Basin in Washington, D. C. Dr. Schoenherr, a NSPE member, is presently dean of the College of Engineering at the University of Notre Dame, a position that he has held for over twelve years. He replaces Dr. F. H. Todd who has returned to England as superintendent, Ship Division, National Physical Laboratory, Teddington.

"We appreciate your loyalty, Higgins. However . . ."

Dr. Clark Dunn Attends Conference at Yale

Dr. Clark A. Dunn, NSPE president-elect, was among the participants at a recent conference at Yale University on "America's Human Resources to Meet the Scientific Challenge." The meeting was sponsored by the President's Committee on Scientists and Engineers and the William Benton Foundation.

Dr. Howard L. Bevis, chairman of the President's Committee, served as general chairman for the meeting. The opening address was given by Dr. James R. Killian, special assistant to the President for science and technology.

A series of round table discussions highlighted the affair. Presiding over these discussions were a number of outstanding leaders, including Eric Johnston, president, Motion Picture Association; Dr. Clarence H. Faust, vice president, Ford Foundation; Senator Lister Hill of Alabama; Dr. Eric A. Walker, president, Pennsylvania State University, Dr. C. W. deKiewiet, president, University of Rochester, and others.

Allen W. Dulles, director of the Central Intelligence Agency, addressed the group at a dinner on "The Soviet Challenge."

Dr. Dunn, who is director of engineering research at Oklahoma State University, stated at the conference that if progress depends on the work of the physical scientists and engineers, they must take an increasing part in the nation's affairs.

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Nuclear Energy Course Slated at Univ. of Cal.

The third annual summer program in "Nuclear Energy for Industry" will be held on the Berkeley campus of the University of California during the months of June, July and August, 1958.

An intensive nine-week "Nuclear Engineering Short Course" for engineers and other technical personnel begins June 16.

Leslie N. McClellan Retires from Govt.

Leslie N. McClellan, assistant commissioner and chief engineer of the Bureau of Reclamation in Denver, Colo., closed a distinguished career of more than forty-five years in the development of water and land resources when he retired in February.

The retirement announcement by Secretary of the Interior Fred A. Seaton said:

"Mr. McClellan's contributions to the development of water and to the technology of irrigation and hydroelectric power have earned him a high place in the history of our water resources development. Because of his long record of engineering accomplishments, Mr. McClellan has gained world-wide recognition, and his services have been sought by many other nations."

Mr. McClellan is a member of the National Society.

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The Asia Foundation Solicits Publications

Contributions of books and journals are needed by The Asia Foundation, a non-profit, non-political organization founded by private American citizens, which supports individuals and groups in Asia who are working for the attainment of peace, independence, personal liberty, and social progress.

In the past two and one-half years the Foundation's special project "Books For Asian Students" has sent 600,000 selected books to more than 1200 universities, colleges, libraries, and civic groups in Asia.

NSPE members should note that publications in every category on the university and college level in good condition and published in 1948 or after, and works by standard authors regardless of date, may be sent directly to: "Books For Asian Students," 21 Drumm St., San Francisco 11, Calif.

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Julius Soled Authors "Fasteners Handbook"

Julius Soled, a member of the New Jersey SPE and NSPE, has recently written a book entitled *Fasteners Handbook*.

The book is said to provide ready, up-to-date answers to fastener problems in all fields. It gives detailed descriptions of all currently available fastener types. More than 900 illustrations are contained in the book.

No Scientist Shortage Says Chicago Educator

The United States is not suffering a serious shortage of scientists, a Chicago educator said recently but it is running low on science teachers.

Dr. Robert J. Havighurst, of the University of Chicago, also disputed reports that the Soviet Union was producing more scientists that this country. These reports are out of balance because of the vast difference in population, he declared.

Dr. Havighurst addressed the convention of the American Association of School Administrators. He said the United States was producing 45,000 to 50,000 scientists a year. This is the biggest number except for a few years after World War II when colleges were filled with veterans, he observed.

He said the need for scientists fluctuated with the state of the economy and the amount of military spending. At present, he indicated, the need is not as great as it has been.

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Engineering Colleges Call For Research Aid

American engineering colleges—already carrying on nearly half of the government-sponsored basic research in engineering now underway in this nation—has called for expanded national support for fundamental research and promised to assume even greater responsibilities for its success.

In a comprehensive summary of the status and needs of research in engineering colleges, The American Society for Engineering Education said recently:

1. Engineering research valued at $100 million a year is now in progress on college campuses.

2. Another $10 million could be accommodated immediately with present staff.

3. The progress of engineering in future years in the United States requires a greatly expanded program of basic research today in all technical fields.

4. Increased support of research in educational institutions is vital for the professional development of the faculties, for new knowledge which will result, and for the qualified students it will help train.

5. Budget uncertainties of late 1957 damaged the "good relationships and the spirit of mutual confidence" which had been built up between the Defense Department and educational institutions. Many cuts remain unrestored, and some new programs are still uncertain.

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(Circle 5 on Inside Back Cover)

Traffic Engineers Plan 10 Seminars in 1958-59

Ten seminars to discuss traffic operations on freeways will be held in 1958 and 1959, the Institute of Traffic Engineers has announced. Four seminars are planned for this year, with the remainder to be held in 1959.

The first seminar is scheduled for Columbus, Ohio, late in April. Following seminars will be held in other areas, distributed so that those interested will in general not have to travel great distances.

The seminars have been planned in recognition of the fact that the new freeways to be built in the coming years will present many new and different problems. Officials at all levels of government will meet new problems during the planning and construction stages, and especially in the operation of the new facilities.

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American Engineer

The Magazine of the Registered Professional Engineer

VOLUME TWENTY-EIGHT NUMBER 4

Fear of Mistakes Stifles Defense

By

C. W. LaPIERRE, P.E.

Vice President, General Electric Company

FOR some time it has been an article of faith in the United States, subscribed to by most of the free world, that we were the masters of technological innovation in almost every field.

On October 4, 1957, this assumption was strikingly challenged by the launching of the first Russian Sputnik. We are only beginning to emerge from the "I told you so's," the finger pointers, and those band-wagon predictors, who can now imagine a host of startling achievements yet to come.

Deep inside, most of us probably hoped that the challenge wasn't real—that after all we would be able to go back to our politics, our sports, our friends, and our businesses as usual. But, everyday there were more and more reports of more and more people all over the world, who had seen a Sputnik. The Sputniks were there, and they

A General Electric T58 turboshaft engine is given a final check before a flight test in a Sikorsky HSS anti-submarine helicopter while another helicopter powered by a conventional piston engine hovers nearby.

represent a great historical first in space technology. How serious to our national security this "first" turns out to be remains to be determined, but the implications cannot be ignored.

The Sputniks must be evaluated along with other capabilities and achievements of Soviet Russia. The Soviet claims to operational long-range ballistic missiles are not fully substantiated by the Sputniks, but must be considered seriously. There are reports of progress in steel production and long distance electric power transmission. They have in service some turbine-powered commercial transport aircraft of relatively unknown performance. Their developments in Army tanks have long been highly rated, and their reputation in artillery is age-old. After a tremendous lead in atomic bombs we had to exert heroic efforts to fire the first hydrogen bomb and then only by a few months' margin. In basic sciences they have made substantial discoveries. Altogether there has never been any basis for a smug assurance that the Soviets could never excel us in anything.

The very recent and real achievements of the Soviet Union have led to all sorts of predictions, many of which are supposed to happen in the months ahead. Is this the time to remember the marked superiority attributed to the MIG 15 in the early days of the Korean War as compared to their final score against North American's F-86 of 14 to 1 in favor of the F-86 over enemy territory?

These illustrate what Walter Lippmann calls "our human propensity to insist on having an opinion when all we are entitled to is an open mind." We need an open mind now to reconsider our methods for producing weapons of defense.

We can and should conclude that the increasing questions regarding our defense superiority are based on real facts of which the Sputniks are only the most striking example.

Nevertheless, we shouldn't lose perspective. The Soviet achievement would be even more impressive if some of their older satellites were in better shape. And, their achievements in a few fields of military and political importance loom the larger—like a few isolated mountain peaks rising from a plain—because of the very low level of the civilian economy from which they arise—and because we see so little of their failures as well as successes.

In any balanced consideration of the Soviet—United States competition, we must still weigh the achievements of our civilian industrial and consumer economy.

For our homes and our industries we have tremendously efficient electric power generating equipment. American earth-moving machinery and construction equipment invariably astonish foreign visitors. Forked trucks, conveyors, and automatic machine tools have drastically improved productivity in our factories, and electronic data processors are beginning to do so in our offices. Artificial industrial diamonds, silicones, synthetic fibres, tremendously efficient and economical telephone systems, including the transatlantic telephone cable recently laid, refrigerators with unheard of reliability, automatic dish and clothes washers, driers, electric and now electronic cooking equipment, and frozen foods, widespread home air conditioners and electric heat pumps: all these for our comfort and convenience, and for our health, there are the new antibiotics and other wonder drugs—the Salk and other vaccines.

Although many other countries have played an important role in science and discovery, and have made major contributions, in making an invention or discovery *socially useful*, in terms of material good to the greatest number, the American private enterprise system must be awarded top honors by a wide margin. Its lead remains unchallenged. This is not to say that our only lead items are civilian goods; nevertheless, our lead is unquestionably more secure in civilian production.

How is it that we are being challenged in defense equipment while we remain unchallenged in civilian goods? Is the process of innovation so different for the one as for the other?

The process of innovation should be no secret in this country, where it has been practiced so well. I will mention the essentials here only as basis for discussing our defense work. Technological innovation is based:

First, on an untrammeled basic research effort from which the practical technology derives, sometimes in strange and unpredictable ways.

Second, an exploration and understanding of the market or the potential uses of possible technologies.

Third, out of the invariably numerous possible programs or products must be selected the one or few that will be most desired when they reach the market.

Fourth, the program must be engineered as a complete system or combination of systems, and progressively down to the smallest new component.

Fifth, the necessary components must be manufactured.

Sixth, it must be assembled and rendered operational, and—

Seventh, it must be operated satisfactorily in service under the conditions encountered.

This process is the same for all technological innovations whatever their applications.

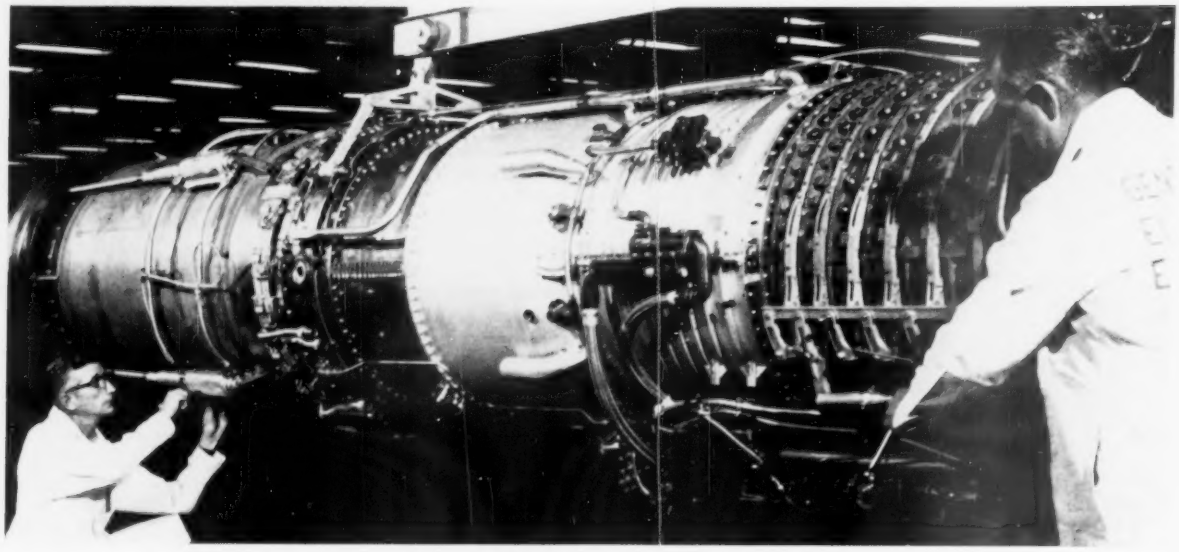
Nor are military products so very different basically from their civilian counterparts. They are no more sturdy than earth moving machinery. They need be no more reliable than commercial aircraft or electric generating equipment or for that matter household refrigerators, which run without attention for years. They are no more complex than a nationwide dial telephone system or an automatic load controlled electric power network. Environment problems for military equipment are tough, but they are also tough for submarine cables, diamond making machines, and so on.

No, it isn't a difference in the process of innovation or a difference in the difficulty of the task that gives us unquestioned leadership in civilian products on the one hand and apprehension about our military products on the other.

The entirely different over-all result can be explained, I believe, by the different approach to carrying out the step by step technological process just described. In making such an analysis there is, of course, no point in criticizing any individual or group in industry or government. We are all responsible to a greater or lesser extent for the conditions under which our military equipment is planned and procured, for we voters in common with all others throughout history have required that our public officials not make the slightest mistake or do anything that anyone might construe as a mistake in vigorously producing, for less and less taxes, what, in most cases, we don't yet know we want. Throughout the ages the inevitable result has always been the prevention-of-mistakes machinery that we call "red tape."

By contrast, we voters in the market place elect as leaders in industry those who produce the most bold and striking innovations. Our rewards to those who succeed are historic.

In any event, our purpose here is to gain as factual an insight into the process of weapon innovation as possible



Shown is a full view of General Electric's newest jet engine—the 10,000-pound-thrust-class J79. The engine has unique features which make it capable of producing more thrust per pound of engine weight than any other aircraft power-plant in its class.

so that we can then decide what, if anything, should be done to improve the result. The following will contrast briefly the civilian and military approaches to each of the foregoing seven steps in the technological process.

First

Civilian-sponsored research is free within the wide limits of the scope of the supporting organization. Programs are approved and appraised by the peers of those engaged in the work. Under these conditions, long chances can be taken, and negative results are sometimes applauded along with the positive. Research and development budgets are usually a fairly consistent proportion of the firm's business. Outstanding success on the part of the individual results in substantial recognition with resulting financial and other rewards.

Government-sponsored research programs must frequently pass the scrutiny of many people—anyone of which may publicize his impressions without investigation however extreme or unfair and whatever the implications may be toward the researcher. The budget wavers with political climate or the constant shift in key personnel. Program changes are frequently precipitous and wholly unrelated to progress. Such an atmosphere is less conducive to a bold research program.

Second

In civilian innovation the impact of new technology on its over-all market is invariably the concern of all levels and functions in any important industrial enterprise. Each studies the possible effect on the corporate operations. Exhaustive studies at customer premises or under customer conditions are normal.

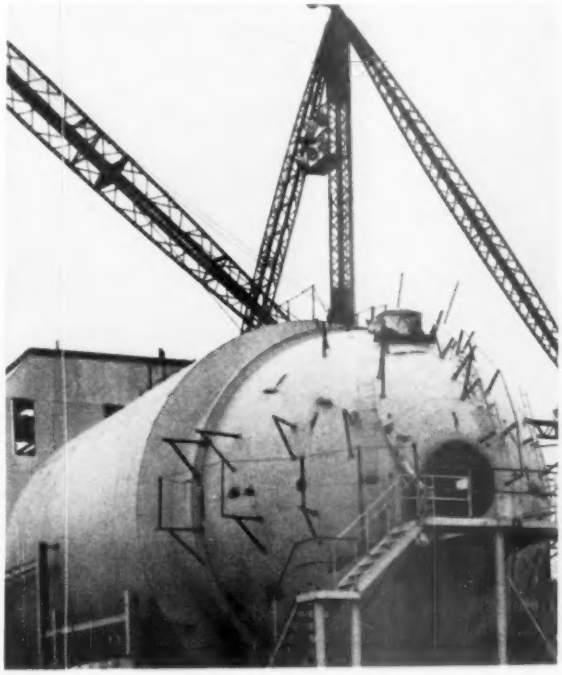
In military products the corresponding industry leaders are almost never consulted in decisions involving military or political strategy in reference to new technology. A decision to contract for, to cancel, or to increase the effort is made almost invariably with only a brief or remote contact with the corporate officials directing the work.

Third

In civilian products the selection of a new product is carefully studied, but for a variety of reasons the customer isn't specifically informed until the product is well along. He is too concerned with present operating problems and perhaps unfamiliar with the technology involved to fully appreciate the possibilities of the proposed new product—without something to look at in the form of a sample or at least a well illustrated proposal.

For military products the customer frequently decides on all the broad specifications for a new product using such expert help as he can employ to guess what industry might be able to do. This is a difficult assignment for anyone not actually engaged in today's rapidly developing technology. There have been some classic examples of military staffs not being equipped to understand the implications of advancing technology. In Germany, for instance, at the beginning of World War II, the world's first jet engine had to be developed by private funds and then an airplane had to be designed and built privately to demonstrate the engine

This submarine hull section, nearing completion at West Milton, N.Y., will house the prototype of the nuclear propulsion plant for the Navy submarine, Triton. The prototype plant and actual nuclear propulsion plant for the Triton are being designed and developed at the Knolls Atomic Power Laboratory (KAPL), which the General Electric Company operates for the Atomic Energy Commission.



before any military interest could be aroused. British experience was similar a year or two later.

This is no indictment of the military personnel involved, but is cited to emphasize the difficulty of their task. They certainly cannot undertake all proposals. Similar failures to see the impact of advancing technology occur in private industry with sometimes extreme consequences to the companies involved, but there are many companies and only one country involved in our case.

Fourth

Producers of civilian products can readily accept full responsibility for performance of their products which are engineered under their control with the end objectives always in mind.

MILITARY procurement agencies frequently retain systems engineering and other engineering responsibilities, with engineering staffs whose continuity and effectiveness must be maintained under the difficult conditions described in the Cordiner Report on professional and technical compensation in the Armed Forces.

Fifth

The type of production and facility plans and process scheduling for producing new civilian products is well understood by management. Once such a program is launched and money committed by a hard-hitting civilian producer, any serious delays cannot be tolerated lest they impair the investment.

By contrast, in military goods production the producer is beset by a considerable number of people with the laudatory, if impractical, objective of preventing all mistakes. These people have tremendous veto powers, but the people with the go-ahead authority are rarely in evidence and sometimes can't be found at all for long periods. The flexibility to "turn on a dime" is lost by this procedure, and many initial mistakes get built-in, to be changed later at much greater expense. There are some good, valuable formulas for reducing the number and cost of mistakes in innovation work, but none of them include uncontrolled delays in correction of such mistakes as do occur.

The time and cost schedules for innovation work rarely include adequate compensation for these delays. This, of course, is true also for civilian production, but the benefits of flexibility in producing civilian products can be amply demonstrated by numerous examples.

Sixth-Seventh

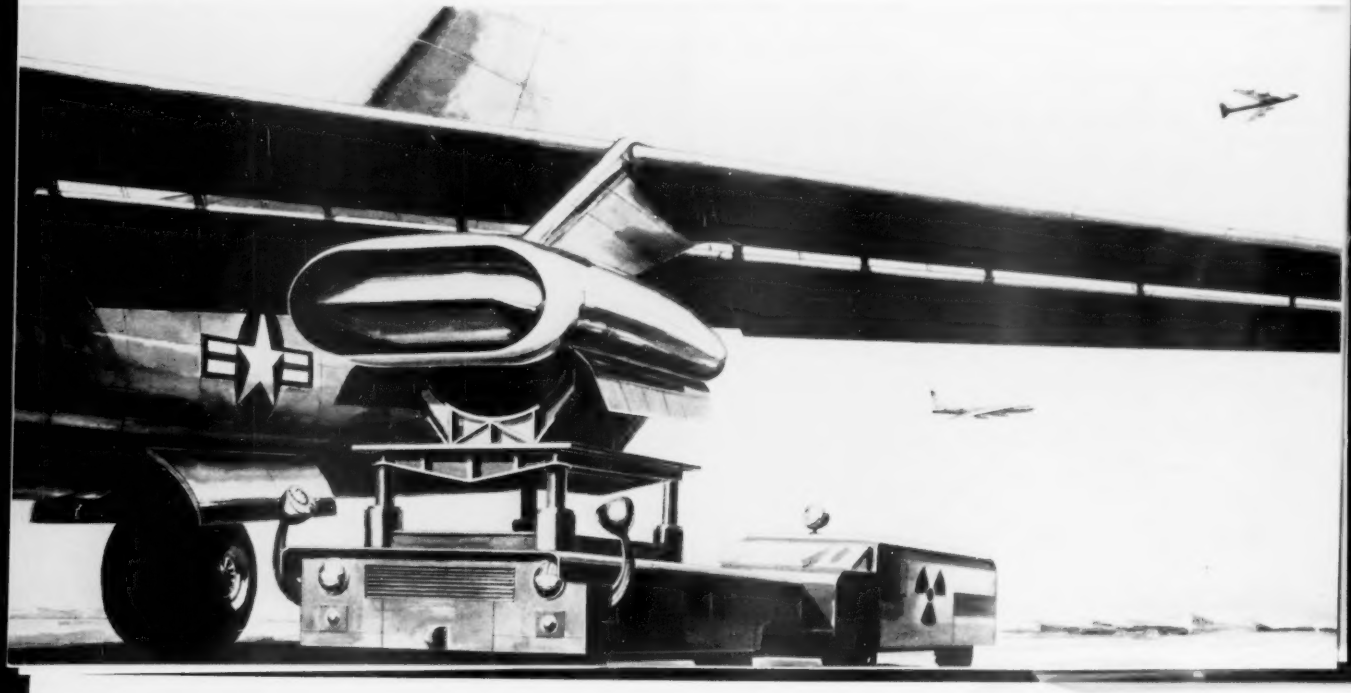
There are obviously great differences between civilian and military production in rendering new and complex equipment operational and maintaining it during service operations. In many cases of new equipment, private contractors can achieve great savings in time and cost if allowed to use civilian product procedures and management to accomplish the task.

Needless to say, the field service testing and maintenance is of vital importance. In this day of nuclear warfare it is dangerous to wait to discover defects after war has started.

In addition to the differences just discussed in the step by step establishment of civilian and military products are some general differences of at least equal significance. Since World War II the cooperation between military and industrial personnel has been drastically reduced. During

(Continued on page 41)

Artist's conception shows how a nuclear propulsion plant for aircraft might be installed. A special shielded vehicle with installation equipment protects ground crew from stray nuclear rays during installation of nuclear power unit.

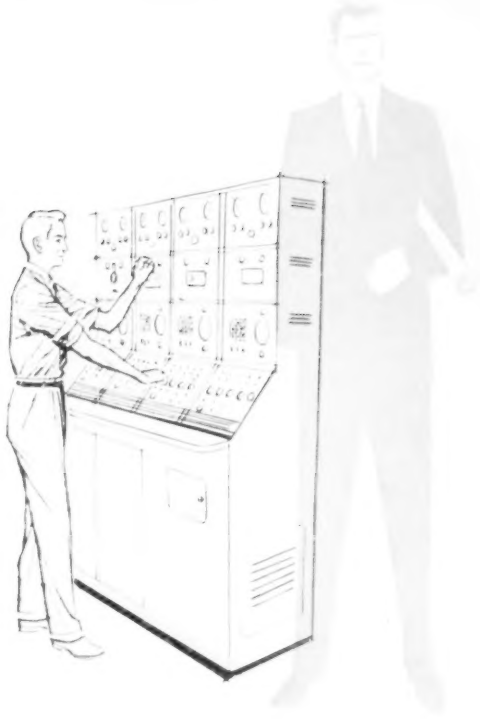


When Are P.E.s in Industry Acting Unethically?

By

FRANK J. TURBETT, P.E.

Chief Engineer, Lasko Metal Products, Inc.



To the engineer employed in industry, an understanding of the principles of ethical behavior may seem to be unnecessary or inapplicable, relating as they do to the dealings between the engineer and the client, the public, and other engineers. The tendency, found in so many corporations, to make a total substitution of the employer-employee relationship for all the others can only be described as anti-professional, because the engineer's duty to society cannot be fulfilled by proxy. In whatever echelon he may find himself, the engineer is obliged to protect the just interests of other individuals and of society *even against his employer* if necessary. This obligation to society is the one attribute which is unconditionally inseparable from the concept of professionalism.

Especially in large organizations, the engineer finds his actual contact with the public virtually eliminated. There is nothing inherently bad about such a situation, for the value of specialization has been demonstrated to be great, and personal contact by the engineer with the public is not essential to his professional activities. However, some danger exists that the engineer may, because of this separation, tend to transfer all of his loyalties to his company or to his immediate supervisor. Wherever this occurs, the individual has lost his professional standing by default, and he has become a technician, a draftsman, or a clerk, with no responsibilities beyond those entailed in doing a creditable and workmanlike job on those tasks assigned to him. Practically the same tasks in the laboratories, on the drawing board, or in the office would be considered professional in stature if they were done with due regard to the rights and reasonable expectations of workers in the factory, buyers and users of the end product, and the general public, as well as the employer.

The isolation of the engineering department from the everyday nontechnical activities of the company can sometimes contribute to an unwholesome lack of interest in all but the technical aspects of a problem or a process or a product. To the engineer belongs the credit and the blame for the working conditions under which a product is produced, for the beauty and utility of the product, for the satisfaction of the customer with his purchase, for the effects the product may have on innocent individuals yet unborn or presently living, and for the ability of his employer to produce at a profit. While other participants in the industrial enterprise may justly claim a share of the credit in success, only rarely should the blame for failure in one of these respects be placed anywhere but on the shoulders of an engineer in charge of one or another of the specialized departments involved.

Some engineers are employed as *process engineers, tool engineers, production engineers,* or *manufacturing engineers;* these have a primary responsibility for the selection of the men and machines to manufacture or produce the product and for the procedures and methods to be followed. In the normal course of their duties, they specify methods and equipment which will produce efficiently the desired quantity of goods of satisfactory quality with complete safety to the workers and with reasonably comfortable working conditions. Since the basic design and quality specifications are substantially inflexible insofar as the production engineer is concerned, his primary responsibilities revolve around his obligations to select for his employer the most efficient methods consistent with practical comfort and complete safety for the workingman. These obligations are serious ones, for the employer depends on his engineers to make profitable operations possible, and the factory worker literally gambles his life on the integrity of the engineer.

No compromise is possible when a human life is at stake: The engineer must unconditionally refuse to allow the installation or specification of any working condition which would endanger the life or limb of a workman who exercises only ordinary care. In every case, the state of training of the least-skilled operator who might be assigned to the job should be considered before approving a process. When only the comfort or dignity of the workingman is involved, the obligation on the part of the engineer still exists, although in this case he need only exert his best efforts to accomplish improvement: if these efforts over a reasonable period of time should appear to be fruitless, the professional engineer who wishes to act ethically is bound to seek other employment and to acquaint the top management of the company with his reasons for resigning.

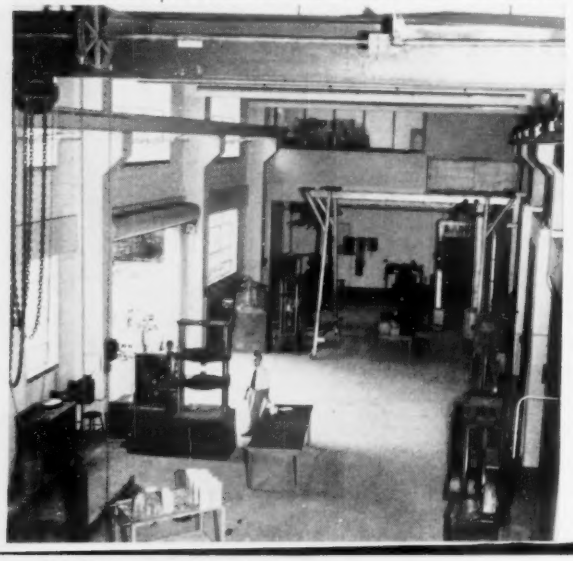
The *product engineer, designer, project engineer,* or

design engineer controls the beauty and utility of the product and has a great deal of influence over the cost of production, the satisfaction of the customer, and the effects on the public. Under ordinary circumstances, the need of the customer is expressed to the product engineer in terms of a functional specification which may or may not be complete. His obligation to his employer is to design the most desirable, useful, and dependable product he can at the lowest cost of production. If he can foresee any special problems in design, testing, producing, marketing, or maintaining the proposed product, he should advise his employer promptly. Inasmuch as the product engineer has the basic responsibility for translating scientific knowledge into the practical design of a useful product, he must be prepared to recognize his unique obligation to refuse to participate in the creation of an immoral or illegal product. The legality or illegality of a product is a matter of public record and the determination of its legal status need pose no problems. Immorality, however, must be judged as a matter of conscience, and a great deal of careful consideration must precede a decision of this sort.

Occasionally, a product engineer is confronted with a situation which involves an apparent demand for a particular product which does not perform its function well, or which is bound to fail in service after a short time, or which appears to be something more than it is. In all cases where it is evident that the public or the consumer is to be defrauded, however subtly, the engineer is bound to prevent the marketing of the product by his company. If he remains convinced that the product is unworthy of an honest place in the market, and if he is unsuccessful in achieving a change in the plans of the company, the ethical engineer will seek employment elsewhere and will acquaint the top management of his company with his reasons for resigning.

THE *plant engineer* or *master mechanic* or *maintenance engineer* is responsible in most companies for providing the means of production and maintaining them in proper condition. His obligation to his employer includes the economical production and transmission of electricity, steam, air, and water to the right place at the right time, the installation and maintenance of production equipment, lavoratory facilities, heating and ventilating equipment, safety devices, and plant protection facilities. All of these items are considered by most accountants to be "overhead" expenses and are thus scrutinized most zealously by management. It is for this reason that most states have found it necessary to pass legislation which defines the minimum standards which a plant must maintain for the protection of the employees. The professional engineer has a specific legal obligation to see that all facilities under his supervision meet or exceed the minimum legal specifications. To correct only those deficiencies reported by the state's inspector is not enough to satisfy the engineer's duty toward the people working in the plant; he must supply safe conditions, and he must provide for a reasonable level of comfort consistent with the human dignity of the workers and with reasonable expenditures of his employer's money.

This testing laboratory for engineering students at the University of Florida emphasizes the growing importance of such units in industry. Should the engineer work on products he knows can harm its users?



Discussions between an engineer and his employer on the relative desirability of safety equipment frequently result in sharp disagreement after disclosure of the cost of the equipment. Management men, while being no less honest or well-intentioned than engineers, sometimes express the opinion that a particular safety device is not worth the cost. Sometimes they are right. A careful analysis of the probability of injury to an employee is essential, followed by a conscientious comparison of all possible means of preventing the probable injury; only then can a positive recommendation be made. If the engineer remains convinced that a particular safety devise is essential, he is obliged to demand unconditionally that it be installed. If the employer still resists, the engineer can only interpret the action as a lack of confidence in his judgment, and he should seek other employment. Failure to resign might be taken as tacit agreement with the decision of the employer.

The duties of the *industrial engineer*, the *time study man*, or the *efficiency expert* to the employer consist in reducing cost of labor and increasing productivity so that wages may be raised or prices reduced without reducing profits. This engineer has what may well be the closest and most direct obligation to the workingman and to the economic welfare of society, for he equates wages to work. The unqualified, sub-professional efficiency experts of the 'twenties and 'thirties unwittingly contributed more to the defensive growth of militant industrial unionism than did any other single factor. Their claim to competence rested in their ability to operate a stop-watch and slide-rule. The professional engineer fulfills his obligation to his employer without attempting to install "speedup" and "sweatshop" practices; instead, he attacks each task on the basis that the workman is entitled to the same just treatment as the employer.

Since there are many areas of severe disagreement on the detailed treatment of savings and improvements discovered or developed through time and motion studies, only a few unequivocal statements can be made. In any case where management through its engineers or supervisors has changed the methods, the company is ordinarily entitled to any savings and conversely must bear any losses. However, in those cases where a method change has been instituted by the workman, he is entitled to a proper reward; if his job were unique, there is no doubt that he would be entitled to all of the labor saving. But, there usually are others doing the same work, who would not justly be due the extra compensation; for this reason, an equitable lump-sum payment is properly made to the originator of the cost-saving improvement. It is the engineer's responsibility to the workmen to make an equitable settlement.

MANY corporations operate research departments in which are employed *research engineers*, *test engineers*, and *development engineers*, whose duties to their employer include a high degree of competence in their specialties and complete integrity in their tests and reports. These engi-

What about possible pollution? Is it the engineer's responsibility?

neers, while being perhaps most remote from the public, are depended upon by the design engineers and the production engineers to provide the basic information without which no sound, dependable product could be manufactured and sold. In this indirect way, every act of the research engineer can be of prime importance to the welfare of the public. The research engineer has a particular direct obligation to the public on which he must be prepared to take a firm stand: In any circumstance where he has positive knowledge that the end result of a particular investigation or project will be immoral, he must refuse unconditionally to participate or co-operate in any way, even though he may have unduplicated knowledge to which his employer may have some claim.

It must be stressed that the engineer must not make such a decision lightly, but should give the matter very grave consideration before arriving at his judgment, since resignation from his position is ordinarily necessary if the employer will not abandon his plans.

The foregoing general description of the scope of the obligations of an engineer employed in industry is of little use in the resolution of day-to-day problems such as these:

Does an engineer have a right to work on products considered immoral by others?

Does an engineer have an obligation to design a product which will never wear out if he can do so at no cost increase?

Does an engineer have an obligation to know what the end use of the product will be?

Does an engineer have a right to work on a product which can have both moral and immoral uses?

Does an engineer have a right to quit his job and start a new company in direct competition with his employer?

Does an engineer have an obligation to resign his position for serious reasons at the expense of his family's welfare?

Should an engineer stand up for his convictions at the possible risk of his job and references?

Since the solution of any specific ethical problem involves a detailed examination of all the pertinent facts and circumstances and a proper application of the canons, laws, or principles involved, no simple list of rules for ethical behavior can be formulated. Consequently, the Canons of Ethics published by the National Society of Professional Engineers and the several codes of ethics published by various other societies and by the state boards of registration are far from being specific enough for day-to-day application. Instead, the engineer must arm himself with an acceptable and defensible moral code upon which he can base all his actions and in the light of which he can interpret and apply the Canons of Ethics. Such a moral code will be more easily arrived at by those who have been fortunate enough to be educated in a religious (i.e. moral) atmosphere, although a bit of mental exercise can start the development of an ethical philosophy from basic principles.

Ethics is a strict and exacting science; in order for an action to be considered totally good or ethical, the intention, the overt act, and the circumstances must be good. In order for an act to be merely acceptable, all three factors must be neutral, if not good. But, if any one of the factors—intention, act, or circumstances—be inherently bad, the act is unethical. Thus, it can be demonstrated that a nominally good deed performed under ordinary or favorable circumstances, but with some ulterior motive, is an unethical act. Similarly, the best of intentions cannot justify an act which is inherently bad, no matter what the circumstances. Furthermore, a good deed with a good intention, but imprudently performed at the wrong time or place can be an unethical act. Thus it becomes necessary for the engineer to practice prudence, temperance, and fortitude, as well as justice, if he wishes to act ethically.

Are you acting unethically?—**End.**

About the Author . . .

Mr. Turbett

Frank J. Turbett is chief engineer of Lasko Metal Products, Inc., West Chester, Pa., a manufacturer of electrical appliances. His past experience in research, development, design, manufacturing, and consulting has given him an opportunity to become familiar with the problems of the engineer in such diverse product fields as machinery, aircraft, explosives, nuclear energy, housewares, and ordnance. He was educated at Casey Jones School of Aeronautics, University of Akron, and La Salle College. Mr. Turbett is registered in Pennsylvania and Ohio. He is a charter member of the Chester County Chapter of the Pennsylvania Society of Professional Engineers and has been chairman of its Ethics & Practice Committee for more than five years.

Important Services of Ethical Review Board

By

ALFRED J. RYAN, P.E.

Chairman, NSPE Board of Ethical Review

RECENT proposal for unification of the engineering profession includes a division of its activities under which NSPE would be responsible for all professional practices. It has been claimed that this proposal is not practicable, because NSPE doesn't police its own membership in regard to ethical practices and is, therefore, not capable of assuming responsibility for the professional practices of the entire engineering profession.

The only way in which this claim can have any resemblance to fact is by overlooking the fact that policing of membership activities is a function of each state society rather than of the officers and Board of Directors of NSPE. The three-level organization plan of NSPE has many advantages over the type of organization where the national organization is paramount and subdivisions are only subservient branches, but it does have two distinct disadvantages in regard to the policing of professional practices.

Policing done at a national level is not as inclusive as that at a state level, but that which is done receives considerably more publicity. It is possible, therefore, to reach the conclusion that little, if any, policing is done when left to the state level. Because of this condition, NSPE is deprived of the general understanding that unprofessional conduct is not, and will not be, tolerated among its members.

The second and even more serious disadvantage is non-uniformity of policing actions among the various state societies. Some have been very active in policing their members and enforcing the registration laws of their state. Others have been very lax. One principal cause of such laxity is the difficulty of establishing an unbiased position at the state level regarding a charge of unethical conduct.

Alleged violations of the Canons of Ethics of NSPE, statements of policy or of the conception of ethical procedure are matters of serious concern to a state society. Unfortunately, most allegations pertain to actions which are borderline rather than "black and white" in nature. The relatively few outright violations can be determined without undue difficulty by the state societies, but determination of the validity of an allegation regarding a borderline case requires considerable personal judgment. Such judgment must be free from prejudice of any sort, but the close relationship among state society members often precludes nonprejudiced opinions at the state level.

If services offered by the NSPE Board of Ethical Review are accepted by the state societies, a large portion of the disadvantages of the NSPE procedure can be eliminated without any diminishment of the advantages. This Board, consisting of one member from each region, was created to help the state societies to obtain an unbiased opinion about an alleged violation of ethical conduct, without interfering with state level responsibility.

Upon request by a state society, the Board will consider the details of a claim regarding an alleged violation and advise the state society of its opinion regarding such claim.

The opinions of the Board are to be returned to the requesting state society in confidence. They are not to be considered binding in any way but are to be used by the requesting state society as it sees fit. Thus, the state society may eliminate the problem of obtaining unbiased opinions, without forfeiting any of its responsibility.

The current problem regarding lack of publicity can be partially overcome by supplemental activities of the Board of Ethical Review. Many of the cases reviewed by the Board may provide a valuable reference source for future allegations. Presenting these cases, devoid of names and with the participating state society's consent, in a Manual of Ethics will provide not only the desirable reference but also proof that NSPE does police its members through its state societies.

As a second supplemental action the Board may recommend to the NSPE Ethical Practices Committee such modifications or additions to NSPE's Statements of Policy as may appear desirable as a result of conditions encountered during the review of allegations.—**End.**

Tellers' Committee Reports Dr. Dunn Elected President

The election of Clark A. Dunn, of Stillwater, Okla., as 1958-1959 president of the National Society of Professional Engineers has been officially announced following a meeting of the Tellers' Committee in Washington, D.C., on March 13.

Other incoming officers, whose election was announced with the tellers' count of the NSPE ballots, are Harold A. Mosher, of Rochester, N.Y.; John B. McGaughy, of Norfolk, Va.; L. Eugene Easley, of Indianapolis, Ind.; W. L. Hindermann, of St. Paul, Minn.; Noah E. Hull, of Houston, Tex., and Howard B. Blodgett, of Reno, Nev.—all vice presidents-elect. Messrs. McGaughy and Hindermann are currently serving vice presidential terms, as is Dr. Dunn. Russell B. Allen, of College Park, Md., was re-elected treasurer for an eleventh term.

NSPE members also voted approval of eight constitutional amendments as proposed by the Board of Directors.

Members of the Tellers' Committee are Peter J. Caffes, chairman, Max H. Morris, Joseph J. Goldberg, Samuel A. Hoover, Scott Heider, and George W. Sturm.

APRIL MEETINGS OF NOTE

American Chemical Society — National Meeting, April 13-18, San Francisco, California.

American Society of Mechanical Engineers — Design Engineering Conference, April 14-17, International Amphitheatre, Chicago, Illinois.

American Welding Society — Conference, April 14-18, Hotel Statler, Exhibition, April 15-17, Kiel Auditorium, St. Louis, Missouri.

Society of Motion Picture and Television Engineers — Convention, April 20-26, Ambassador Hotel, Los Angeles, California.

Association of Iron and Steel Engineers — Spring Conference, April 21-23, Dinkler-Tutwiler Hotel, Birmingham, Alabama.

American Society of Lubrication Engineers — Annual Meeting, April 22-24, Hotel Cleveland, Cleveland, Ohio.

FROM WASHINGTON

BY
MILTON F. LUNCH,
N.S.P.E.'s Legislative Counsel

ORGANIZING PUBLIC WORKS TO COMBAT THE RECESSION

IT is now altogether respectable to refer to the economic situation as a "recession," a word assiduously avoided earlier in official administration circles in favor of "downturn," "readjustment," "decline," etc. The implications of this economic fact for the engineering profession are many and varied. In Washington, at least, the recession has become the Number One topic of interest, discussion and planned action in Congress and elsewhere. Sputnik, defense reorganization, Federal aid to education—and other "burning" issues of a month ago—have been relegated to second place.

After several months of confusion and contradictory estimates of just where the nation stands economically, the picture came into some focus in the middle of March when the Government's unemployment figures for mid-February were released. The bald facts were these: 5.2 million were unemployed, a rate of 6.7 per cent of the civilian labor force, about the same as during the winter of 1949-50. Of the unemployed, about half are men twenty-five years of age and over; a fifth are younger men, and the balance—about thirty per cent—are women. Employment has gone down mainly in manufacturing, where there were 1,360,000 fewer jobs this February than a year ago. There was a loss of about 300,000 in construction employment and a decline in transportation. Almost all of the decline in manufacturing is in the durable goods industries. The greatest reductions in employment occurred in automobiles and aircraft, with 300,000; primary metals and the fabricating of metals, with 330,000 employees, and the manufacture of electrical and other machinery, with 340,000.

These facts are important because they are central to the discussion and decision of what type of Federal action is most desirable to meet the situation—no one questions that drastic and far-reaching action will be taken. The main general question of the moment is whether the emphasis should be on a large expansion of public works, coupled with an increase in defense spending, or an immediate tax cut to provide more consumer purchasing power. The most likely result is to push the public works approach and hold off a tax cut for as long as possible in the hope that the stimulus from public works activity will make a tax reduction unnecessary. If the mid-March unemployment figures show another economic downturn, however, the pressure for a tax cut will be almost irresistible.

◄ Senator Dennis Chavez of New Mexico

Senator Albert Gore ► of Tennessee

The battle lines are forming now over the type and extent of the public works expansion. In general, the issue is between the Democratic proposals for far-reaching measures and the Administration's more conservative approach. For example, Chairman Albert Gore (D., Tenn.), of the Senate Public Works Subcommittee has introduced a bill authorizing an additional $12 billion over the next ten years to the major interstate highway system to make possible its completion within the original 13-year period planned in 1956. Under Secretary of Commerce Louis S. Rothschild, speaking for the Administration, has denounced the Gore bill and proposed an additional $2.2 billion over the next three years. Both sides want to expand and hasten the highway program; the difference is one of degree. The Administration argument is that

the highway program is of such magnitude and national importance that it cannot be permitted to fluctuate violently.

Headed for apparent approval are two "sense-of-Congress" resolutions, asking for stepped-up public works construction. The first passed the Senate by a vote of ninety-three to one, with Senator Norris Cotton (R., N.H.) casting the lone negative vote. Senator Cotton had previously declared his opposition to any "crash program of pump-priming" at this time. Senator Francis Case (R., S.D.,) ranking minority member of the Public Roads Subcommittee, succeeded in adding to the resolution a sentence commending the President and the executive agencies "for such action as they have taken to accelerate these (public works)

Senator Norris Cotton of New Hampshire

programs." Senator Case referred to such Administration measures as a $5½ billion increase in defense orders contemplated for the first six months of 1958 over the last six months of 1957, the increase in highway program spending, the requests for water resource projects totaling $186 million, and a $2 billion post office building program.

The Senate Public Works Committee, under the chairmanship of the veteran Dennis Chavez (D., N.M.) will probably begin hearings very soon on a number of bills designed to establish a massive public works program similar to that of the thirties. President Eisenhower, in letters to Republican congressional leaders, has strongly attacked these recent proposals. "I am concerned over the sudden upsurge of pump-priming schemes, such as the setting up of huge Federal bureaucracies of the PWA or WPA type," he said. "That kind of talk evidences lack of faith in the inherent vitality of our free economy and in the American as an individual. Schemes of that kind reflect the fallacy that economic progress is generated not by citizens wisely managing their own resources, but by the wholesale distribution of the people's money in dubious activities under Federal direction. Unsound programs of that kind would do great damage to America rather than contribute to our economic strength."

The President's attack was directed against the type of bill introduced by Senator Gore, and supported by Majority Leader Lyndon B. Johnson (D., Tex.). The Gore bill would establish a Public Works Administration with a $500 million fund to contribute ninety per cent of the cost of public works projects needed to reduce unemployment in designated areas. After the President's criticism, however, Senator Chavez introduced a five-year $14 billion public works program for a wide variety of projects except highways. The Public Works chairman said his was not a "crash" program but was a "uniform" program for the purpose of efficiency and to avoid "starts and stops."

In the House, Rep. Albert Rains (D., Ala.), and twelve of the sixteen other Democrats on the House Ways and Means Committee proposed a $2.5 billion loan program to municipalities for sewer and water facilities, libraries, transportation facilities, public buildings, fire and police stations, etc. A further sign of the times in the Congressional mood was the House action in passing a bill for $1.5 billion worth of water projects in the face of warnings of a Presidential veto. The vote was a lop-sided 321 to eighty-one even though the President vetoed a similar bill in 1956.

The current situation will provide a real test for the worth of the advance planning program which has been supported by the engineering profession over the years. The original and present concept of the program was that when the time arrived for a quick pick-up in public works activities, the engineering and design work would be ready without delay; that there would be a shelf of public works plans, "ready to go." At the end of January, 1958, the program had embraced 400 communities, counties and urban areas, with planning applications approved to cover construction estimated to cost approximately $700 million. The Community Facilities Administration estimates that such a volume of construction will provide at least 50,000 man years of direct employment. Approximately forty-six per cent of the approved applications are for sewers and water facilities, thirty-one per cent for schools and educational facilities, and the remainder for public buildings, roads, streets and other public facilities.

If a massive public works program becomes a reality there is bound to arise again the discussion of the Government's organization for administration. In this connection, it is pertinent to note that the Associated General Contractors have called for a permanent Federal coordinator of public works planning and construction on the basis of legislation, rather than the present arrangement whereby Maj. Gen. John J. Bragdon holds the appointive title of coordinator in the President's office. The AGC resolution favors coordination of all Federal, state and local public works activities, but would leave the continued originating, engineering and execution in the existing separate agencies.

In addition to the PWA type of approach, as suggested in the Gore bill, and the coordinator concept with individual agency control, there is the more controversial suggestion of a centralized operating agency with complete control and direction of public works. NSPE has long supported a policy favoring the establishment of a centralized Federal Department of Public Works, the responsibility of which would be to perform the functions that are now assigned to public works divisions of each Federal agency. The NSPE position is that the Department of Public Works should be at the cabinet-level and should be headed by a registered professional engineer "who has had long and varied experience in the administration of engineering programs."

Gen. Hershey, SS Chief, Discusses Defense Use of Engineers

Editor's Note: The general subject of how engineers can best be used in the national interest as part of the defense scheme, long has been a topic of lively debate. Should he be made to serve as a private soldier, his vital skills wasted, or should he, like the doctor, be assigned, either as a member of the armed forces or as a civilian, to needed engineering work. What follows is recent comment on the subject. Mr. Kirkwood is an active member of both the Missouri SPE and the NSPE.

The Missouri Letter . . .

General Lewis B. Hershey, Director
Selective Service System
451 Indiana Avenue, Northwest
Washington 25, D. C.
Dear Sir:

With the present emphasis on the critical shortage in this country of scientific, engineering and specialized personnel, this committee feels that this is an appropriate time to recommend that measures be taken to assure the retention of such trained personnel in those positions where their skills are being fully utilized.

This committee recommends that engineers, scientists, and those persons possessing scientific and technical skills, as well as those persons serving in a capacity wherein they are supporting such skills, be assigned to some category that would remove them from the possibilty of being drafted, provided, of course, that they are engaged in activities which are contributing to the national health, safety, or interest. It is the opinion of this committee that such a policy would be in line with the thoughts expressed by President Eisenhower in his recent speeches. Furthermore, such a policy would relieve local boards of the responsibility of determining policy with regard to these particular types of occupational deferments.

Immunity of this kind would further serve to encourage more young men to specialize in the field of science and engineering—a need which has long been recognized by industry and scientific groups and one which is presently receiving much attention throughout our nation as a result of the launching of the Russian satellites.

It is the hope of this committee that action in this direction will be taken in the very near future.

Very truly yours,
A. C. Kirkwood, Chairman,
Missouri Advisory Committee
on Scientific, Engineering &
Specialized Personnel to the
Selective Service System

Gen. Hershey's Reply . . .

Mr. A. C. Kirkwood, Chairman
Missouri Advisory Committee on
Scientific, Engineering & Specialized
Personnel to Selective Service System
901 Walnut
Kansas City 6, Missouri

Dear Mr. Kirkwood:

This is in reply to your letter of November 19, 1957, which proposes that specialized personnel in scientific and engineering fields be so categorized, if contributing to the national interest, as to grant them immunity from military duty.

Section 1622.22, Selective Service Regulations, reads as follows:

> "In Class II-A shall be placed any registrant whose employment in industry, or other occupation or employment * * * or whose activity in research, or medical, scientific, or other endeavors, is found to be necessary to the maintenance of the national health, safety, or interest."

This provision which is tantamount to law, seems to me to provide a close approximation of, if not precisely, the protection you advocate. To implement its effectiveness, provision has been made for review by selected groups of scientific, engineering, and specialized personnel, especially well qualified to perform this service. With the extensive provisions for appeal, it is difficult to conceive of any administrative procedure that would provide greater safeguards and still be workable.

If we are to weigh the word "deferment" vs. "exemption," we are to a large degree indulging in semantics. Neither lasts longer than the reason for it continues. One is subject to change by the Congress and the other by the President.

It appears from your letter that there is no issue as to the necessity of avoiding permanence of immunity, deferment, or exemptions since you say: "* * * provided, of course, that they are engaged in activities which are contributing to the national health, safety, or interest." You take cognizance of the fact that scientists, for financial and other reasons, frequently do not remain in scientific fields or, remaining in such fields, do little or nothing in support of the national interest. I assume then that you are opposed to deferment when a scientist no longer qualifies for it, by either declining to pursue his skill or by diverting his endeavors from the national interest.

There are times when mysticism envelops the word "criteria." There is a feeling that if criteria are adequately spelled out, judgment is supplanted. That is not true. Judgment is still necessary to determine whether any one man meets the criteria, whatever they are. If education and the externally disciplined attainment of degrees are arbitrarily employed, Edison and others of our great scientists would fail to meet the criteria.

There is another issue implied: that of classification of skilled groups by themselves, rather than by impartial individuals. It is inherent in human nature that a man who has done his best to become skilled and is doing his best in his skill believes he is contributing more than most others. Also, the nature of shortages changes unpredictably. When the shortage of physicians or dentists is acute, they desire, understandably, but not necessarily justifiably, to judge themselves. When the shortage of food and fiber is acute, farmers desire automatic immunity on the basis of their own judgment. If pride of skill and inconstant shortages were permitted control, it would be only a short time until each skill, semi-skill, and eventually each organized group would be judging its own personnel. The resulting administrative chaos would be devastating to the national interest, particularly at this time.

I sincerely believe we now have a system which is workable, unprejudiced, and effective in support of the objectives you describe. In fact it has attained those objectives as evidenced by the fact that the Selective Service System has not been charged with the current shortages of scientific personnel. It is in line with the recently expressed thoughts of the President who is the author of the regulations under which the System operates.

Sincerely yours,
/s/ Lewis B. Hershey,
DIRECTOR,
Selective Service System

• An AE Staff Report •

U. C. L. A.'s Engineering Executive Program

In the fall of 1957, some thirty freshmen met at the University of California Conference Center on Lake Arrowhead, eighty-four miles east of Los Angeles. These freshmen, beyond the crewcut stage, were working engineers in their late twenties or early thirties, many accompanied by their wives, receiving their official introduction to UCLA's Engineering Executive Program.

The concept of the EEP originated with L. M. K. Boelter, dean of the College of Engineering at UCLA, as early as 1947. Dean Boelter and his staff had observed the post-war trend of filling top administrative positions in industry with engineers, even with engineers who had no background training in management.

The cause of this trend seemed fairly obvious: American industrial technology was becoming increasingly complex, and even the most capable administrator needed a sound technological background, or, as one EEP staff member put it, "If you are going to manufacture nuclear reactors you had better know a good deal about the technical aspects of nuclear reactors." Given this premise, it seemed easier to take an engineer with some managerial talent and train him to become an executive, than to ask a high-level administrator to go back to college for a four-year engineering course.

Two corollaries developed from this proposition:

(1) Not only is the engineer getting into high administrative positions through the technological default of the present managers, but his scientific training and analytical mind is especially suited to solving a whole complex of administrative problems.

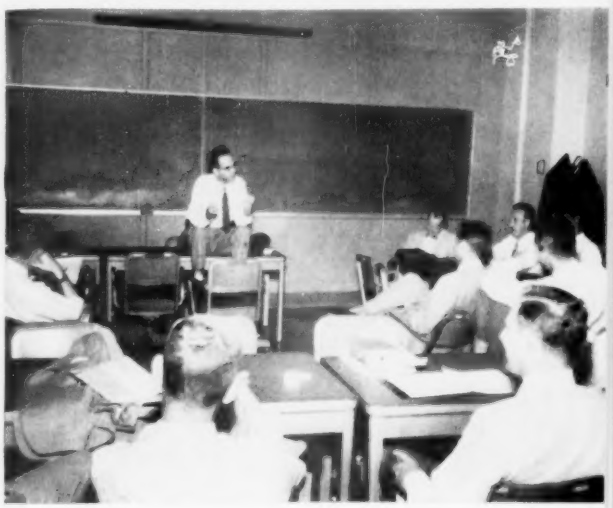
(2) The rise of the engineer in the managerial hierarchy has coincided with a vast increase in the influence of American business leaders on local, national, and international affairs. Our universities, therefore, "have to start breeding a generation of technical managers who have a strong feeling for the social consequences of their jobs," as Morris Asimow, co-director of the EEP, put it.

With these basic concepts in mind, Dean Boelter, in 1952, turned to Joseph F. Manildi, then associate professor of engineering at UCLA, and now general manager for Thompson-Ramo-Wooldridge Products, Inc., and asked him to explore the possibilities of setting up a concrete program for full-time working engineers within the framework of a state university.

Dr. Manildi became head of a six-man committee, including professors trained in engineering, business administration, and psychology, which spent two years analyzing not only the programming of such a venture but the quite complex administrative and academic problems.

During part of his 1953-54 sabbatical leave, Dr. Manildi visited universities which had done pioneering work in the proposed field. He investigated programs at the University of Chicago, the Massachusetts Institute of Technology, Harvard, Columbia, and the Carnegie Institute of Technology. From some of the ideas gathered on his trip, the findings of the UCLA committee, and in-the-field advice of Los Angeles' technological industries, Dr. Manildi and his staff evolved a program which they presented to Dean Boelter and Dr. Raymond B. Allen, chancellor of UCLA, in late 1954.

As outlined, and since put into practice with minor variations, the keynote of the program is "Education by Action." The term "Executive" in the EEP is used in its basic sense, as one who acts and executes policies and projects on his own incentive and initiative.



The EEP is a two-year course, consisting of twenty-four units, and divided into four major fields of study—The Engineer in the Technical Environment, The Engineer in the General Environment, The Engineer in the Business Environment, and Group Project Studies in Engineering Systems.

The Engineer in the Technical Environment, supervised by Dr. Asimow, takes up almost forty per cent of the curriculum and directs the engineer to first familiarize himself with the analytical tools and methods of his profession, then analyze the application of these tools, and finally apply these tools in actual practice.

Perhaps the key tool in the engineer-administrator's arsenal is the quantitative method, and one of the major aims of this part of the course is to encourage the student to use the quantitative approach, frequently summarized as "Operations Research," in evaluating and deciding administrative problems.

Top photo: Dr. Morris Asimow, UCLA professor of engineering and co-director of the EEP, explaining Bendix digital computer to, l. to r.: Jack Golden, American Machinery and Foundry; Paul Hendricks, Consolidated Western Steel, and Harris Seitzew, Capitol Records.

Left photo: Dr. Paul Kircher, associate professor of accounting at UCLA, conducting a 'The Engineer in the Business Environment' class in the EEP.

Bottom photo: Dr. Asimow explains computer to EEP sophomore class.

The method calls for a four-stage approach to the given problem:

(1) The construction of a mathematical model which approximates the actual system.

(2) An examination of the adequacy of the model in the light of the required answers.

(3) Application of the behavior characteristics of the actual system to the model and deriving from this the potential behavior of the actual system under a variety of conditions.

(4) An analysis of the model studies with the results to be applied to the real system.

It goes without saying that frequently the model can only resemble the real system, and that the more complex and stringent the required prediction the more complex the mathematical model required.

The quantitative approach is basic to the program. Typical quantitative tools include probability theory, statistics, queueing theory, dynamic programming, reliability, numerical analysis and variational calculus.

In the second phase of the Technical Environment class, published case studies of actual problems employing these analytical tools are brought before the class. Subsequently, the instructor discusses the author's approach and application of techniques, and the students make a critical evaluation of the results.

In the third phase of the class study, each student is assigned one paper, which demands a thorough research in the literature of his field, and results in a quantitative study which is fed into a computer.

The Bendix digital computer is an integral part of the program, and, perhaps for the first time, has been put right in the classroom, as essential a tool to the EEP as the globe to a geography class.

The planners of the EEP took it as a basic tenet that the engineer plays an important part in his social environment, and nowhere more so than in the role of engineer-executive. With this truism in mind, the part of the program devoted to The Engineer in the General Environment takes up twenty-five per cent of the course, divided into three semester-phases.

It is this part of the EEP which emphasizes most strongly that there are areas in life and business where the quantitative approach is insufficient and must give way to a qualitative evaluation.

The qualitative approach is essential not only in the executive's daily contacts with his employees, but it vitally affects "the responsibility of industry to the community, in fields ranging from H-bombs to shifts in housing patterns," according to John Lyman, associate professor of engineering and psychology, who heads the General Environment course.

In the initial phase, the student is made aware of the role of human value systems in arriving at decisions and achieving successful cooperation for carrying them out. After this introduction, emphasis is placed on the upheaval caused by technological progress in the life and thinking of the community.

"More progress in inventions and communications has been made since 1900 than in all of history up to that time," says Dr. Lyman, "and man's emotional and intellectual adjustment has had a difficult time keeping up."

THE material, in this phase, ranges from the general to the particular, from changes in art forms and in the role of the housewife to the ethical and legal aspects of workmen compensation, property location and anti-smog laws.

Engineering top executives conduct much of the second

Dr. J. F. Manildi, left, and Dr. John Lyman, center, are shown being interviewed by Tom Tugend of UCLA's office of public information.

phase of General Environment, leading seminars in complex technical management problems, including personnel and promotion selection, layoffs and contract requirements.

During the third phase, classes concentrate on analyzing the natural and human resources of the world, with emphasis on such local problems as selection of plant sites and development of industrial areas. For the last five sessions the class takes over and selects its own program, perhaps calling on representatives from the Chamber of Commerce, the Mayor's Transportation Committee or the Superintendent of Schools.

Another twenty-five per cent of EEP is devoted to the Engineer in the Business Environment, which does not aim at making the student a professional accountant or statistician but to give him a sufficient understanding of these skills to make rational decisions on the financial responsibilities of his company.

Dr. Manildi has divided this part of the program into six blocks of study:

(1) The use of basic accounting as an analytical tool with emphasis on the case study method.

(2) The policy and theory of equipment replacement, stressing the quantitative approach.

(3) Research in cost accounting.

(4) Preparation of company budgets and financial control.

(5) Operational gaming to highlight financial policy and financial planning.

(6) Discussion of selected problems in operations, as in allocations, scheduling and planning.

The studies in EEP's three basic fields are synthesized in the last semester's Group Project Studies in Engineering Systems, an unusual and imaginative equivalent of the standard Master's thesis.

A massive project is assigned to the entire class, with smaller subgroups researching specific aspects of the project. For a concrete illustration, let us assign one class the project "Community Planning in the Los Angeles Metropolitan Area" and divide the project into its field components more rigidly than occurs in actual practice.

The technical environment aspect of the project would apply the quantitative method to consider projected population growth, the forms of industrial expansion, and transportation and marketing problems.

The social and psychological considerations of the general environment field might come into play in the Los Angeles preference for traveling singly rather than in car pools, the predilection for single family dwellings, California migration trends, and zoning and legal ordinances. Fiscal policy and taxation in Los Angeles would be the major preoccupation in the business environment analysis of the project. The standard demanded of the completed project is that it should point out the direction of a solution and be worthy of publication.

To qualify for the EEP, an applicant has to meet the high UCLA requirements for graduate status, and the even higher standards of the College of Engineering, which demands a Bachelor of Science degree from a university with an accredited engineering curriculum and a "B" average in all previous academic work.

In addition, both the University and the EEP directors added specific provisions. The University stipulated that the entire program must be self-supporting and the EEP required that applicants must have at least five years of industrial experience and be not over thirty-nine years old.

The final stage of the exhaustive selection process is an hour-long interview with an EEP staff member, which probes the applicant's long range objectives and managerial aptitude.

In the spring of 1955 most of the academic and administrative details had been ironed out. Dr. Manildi was named director of the program, which was supervised by the Department of Engineering and the UCLA Graduate Division, with University Extension serving as fiscal administrator. The semester fee was set at $300 (or $1200 for the four-semester course), frequently paid by the student's employer.

The first class of thirty engineers met in the fall of 1955 for its first weekly five-hour Monday afternoon and evening class. In addition, the student had to supplement each classroom session with fifteen hours outside work on the program, at the same time, of course, continuing his regular full-time job.

Fully aware that this kind of intense schedule imposes a real burden on the student's family, the program has from the beginning emphasized the social side, from the weekly dinner meeting sandwiched between class sessions to informal orientation weekends at the beginning of the first and second school year and student-organized social functions.

With the first graduates receiving their Master of Engineering degrees in 1957, and the third freshman class now in session, how well has the program worked?

As with any pioneer program exploring new fields, the initial class tried out some new ideas and methods which were subsequently modified and rejected. A very random and unscientific sampling of two graduates and three members of the present sophomore class reflects a surer planning and changing student attitude toward the EEP.

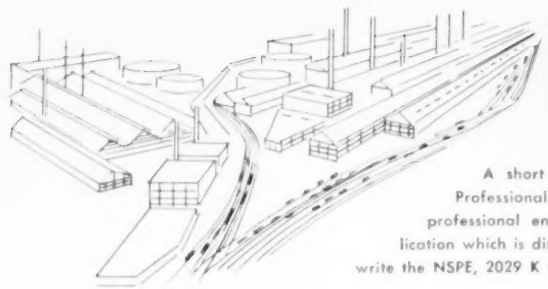
GRADUATES William Milwitt of the R.C.A. Laboratory in Burbank and Howard G. Wilson of the Hughes Aircraft Company both praised the broad outlook of the General Environment course and the usefulness of the accounting studies, but centered their criticism on attempts to apply exact mathematical tools to business areas which they felt did not lend themselves to such an analytical approach.

More unreserved enthusiasm was shown by the three sophomores, Frederick J. Seufert, Jr. of the Hoffman Laboratories, Harris Zeitzew of Capitol Records, and Donal A. Meier of the National Cash Register Company.

"This program fulfills a need that isn't supplied in any other form," says Mr. Zeitzew. "It certainly increases your managerial job potential. I only wish a student could make up the classes he misses when he is sent out on the road by his company."

(Continued on page 47)

ENGINEERING EMPLOYMENT PRACTICES DIGEST



A short digest of a monthly bulletin published by the National Society of Professional Engineers in the interest of advancing cooperative relations between professional engineers and their employers. To regularly receive the complete publication which is distributed widely to industrial, commercial and educational organizations, write the NSPE, 2029 K St., N.W., Washington 6, D. C.

✓ At press time the picture on Government pay increase legislation is shown by the following table from an NSPE statement designed to support the request for a full percentage salary increase for engineers and scientists:

	INDUSTRY AVERAGE	PRESENT MAXIMUM	(H.R. 9999) HOUSE COMMITTEE	(S. 734) SENATE-PASSED
GS- 5	$ 5,752	$ 4,480	$ 4,965	$ 4,815
7	6,780	5,335	5,930	5,735
9	7,293	6,250	6,965	6,720
11	9,168	7,465	8,340	8,020
12	10,156	8,645	9,670	9,290
13	12,005	10,065	11,275	11,000
14	14,342	11,395	12,780	12,500
15	16,602	12,690	14,235	13,800

* * * * *

The urgency for action on Federal pay raises has slipped somewhat as the "recession-unemployment" problem became dominant in Washington. One possible effect of the concern over the economic situation may be to reduce the amount of the proposed pay increases. Long-range proposals for a massive public works program and speed-up in the interstate highway program are significant in terms of demand for more engineers in government at all levels.

* * * * *

✓ **Meetings of interest to engineering employers: Summer Conferences sponsored by Management Development Center of Caltech, "Supervision of Engineers," June 22-27 and Sept. 14-19. Contact: Milton Gordon, Associate Director, Management Development Center, Caltech, Pasadena, Calif.**

"Managing Engineering to Meet the New Technological Challenge," conducted by American Management Association's Research & Development Division, April 9-11, 1958, Statler Hotel, New York. "How to Capitalize on Research & Engineering Talent," sponsored by AMA's R&D Division Huntington-Sheraton Hotel, Pasadena, Calif., May 6-7, 1958. For above two meetings contact AMA, 1515 Broadway, New York 36.

* * * * *

✓ Witty Consultants of New York, a management consulting firm specializing in manpower research, forecasts that 1958 will be the year of the "Scientist-Engineer" ascendancy. The forecasters say a major shortage of general engineering personnel will prevail, "and an even more drastic shortage of 'scientist' and 'engineer specialists' will pose an even greater threat."

✓ **An Atomic Energy Commission survey of scientific and engineering manpower requirements for atomic energy activities shows a current need for nearly 34,000 scientists and engineers, "but no critical shortages," as reported in the AEC's 23rd Semi-annual Report, January, 1958. In 1956 an estimated 7,000 to 7,500 scientists and engineers were employed, either full time or part time in some phase of industrial atomic energy activities. Some shortages were reported, particularly of reactor and metallurgical engineers, "but there does not now appear to be a critical shortage for private programs."**

The current limited shortages may become greater in future years, the AEC report adds. The survey estimate for 1957 was that 9,000 scientists and engineers were required, and for 1960, approximately 16,000. Preliminary results of the third part of the survey, dealing with the requirements for scientific and engineering manpower for atomic energy activities in colleges and universities, compiled by ASEE, show 3,800 scientists and engineers were devoting at least part of their time to atomic energy interests in 1957. An increase in 1958 to about 4,300 is anticipated, and by 1960 the total should stand at approximately 5,300.

* * * * *

✓ A survey reported in *Management Methods* for October, 1957, shows that most firms are causing their own engineer shortage through mismanagement of engineering talent. Among the recommended correctives: better planning, improved scheduling, anticipation of crash projects, providing engineers with real leadership, giving more than lip service to communications with engineers.

* * * * *

✓ **NSPE state societies are cooperating with the President's Committee on Scientists and Engineers to develop and conduct local conferences on improved utilization. Most of the conferences are co-sponsored by the professional state society and the state university. Among those scheduled for the next several months are the following:**

April 14-15, Montana State College (Dean Schilling); April 21-22, R.P.I. (Provost Hemke); April 25-26, University of Minnesota (Dean Spilhaus); April 25-26, Michigan State (Mr. Kruger); late April or early May, University of Buffalo (Dean Mohn); May 6-7, Bradley University (Dean Gibbs); May 13, Drexel Institute (Dean Bowman); Spring, University of Connecticut (Dean Torgerson).

For more information about these meetings contact the university official indicated, the local state society of professional engineers, or NSPE headquarters.

Robbins at Pittsburgh

Shown at the University of Pittsburgh's Engineering and Mines School are, l. to r.: Prof. N. L. Buck, head, Dept. of Mechanical Engineering; Prof. R. L. Gorham; Paul H. Robbins, NSPE executive director; Dean W. H. Turkeo, acting dean—Engineering and Mines School; Prof. V. J. Lopardo; N. T. Neff, program chairman, Pittsburgh Chapter, PSPE, and W. M. Lee, instructor.

Running Out of Space

Former NSPE President T. Carr Forrest, Jr., right, has a problem. Space to identify his employees' registrations is running out, and the firm must find new display area. Newest additions to registration are A. L. Dougal, left, and Robert E. Hogan, center.

Award to Dean Carson

Gordon B. Carson, dean of the College of Engineering at Ohio State University, acknowledges the receipt of the scroll and the title, "Technical Man of the Year" of the Central Ohio area at the annual banquet of Columbus Technical Council, in Columbus. At his left is CTC President James A. Flint. Dean Carson, a member of NSPE, was recently appointed vice president, business and finance, at Ohio State.

Executive Director Speaks to Students

On a recent trip to Pittsburgh, Paul H. Robbins, NSPE executive director, addressed the 1800 undergraduate students enrolled in the Engineering and Mines School of the University of Pittsburgh, and also spoke at a special program of the Pittsburgh Chapter of the Pennsylvania SPE devoted to Engineers-in-Training.

The main topic of the talk to the students was the problems they must conquer on their road to professional status. His talk was the kick-off of a campaign to interest students in a student chapter of the Pennsylvania SPE to be organized early in the spring semester.

The formal organization meeting was held during Engineers' Week. The students' interest in their own professional development was demonstrated by the large turnout for the first meeting. Over one hundred junior and senior students have applied for membership in this the first student chapter in Pennsylvania.

During Engineers' Week, Mr. Robbins spoke to several groups in West Virginia, including the Fairmont Chapter of the West Virginia SPE, Fairmont Rotary Club, Charleston Rotary Club, and to students at the University of West Virginia.

NSPE President Garvin H. Dyer and the executive director both addressed the annual meeting of the Kansas Engineering Society and also the joint meeting of the Nebraska SPE and the Nebraska Engineering Society.

In addition, Mr. Robbins recently visited five chapters of the Louisiana Engineering Society, NSPE's newest affiliate.

Myhra Dies . . .

R. H. (Mike) Myhra, 54, of Bismarck, N. Dak., died recently of a heart attack. He was a field engineer for the Portland Cement Association at the time of his death.

Mr. Myhra was very active in both the North Dakota SPE and NSPE. He served as president of the former group as well as being a national director.

Other Recent Deaths:

William Bowen Gallaher, Jr., of Waynesboro, Virginia, member of Virginia Society of Professional Engineers.

Charles Laurence Talbott, of Waynesboro, Virginia, member of Virginia Society of Professional Engineers.

NSPE's State Presidents' Meeting Held at Purdue in March

FORTY states were represented at NSPE's State Presidents' Conference March 7-8 at Purdue University, West Lafayette, Ind.

The purpose of the conference was three-fold: (1) To permit an exchange of state society administrative experiences; (2) To better acquaint the state presidents with professional society philosophy and programs, and (3) To provide state presidents an opportunity to pose questions arising in the state society on which other states may have had experience.

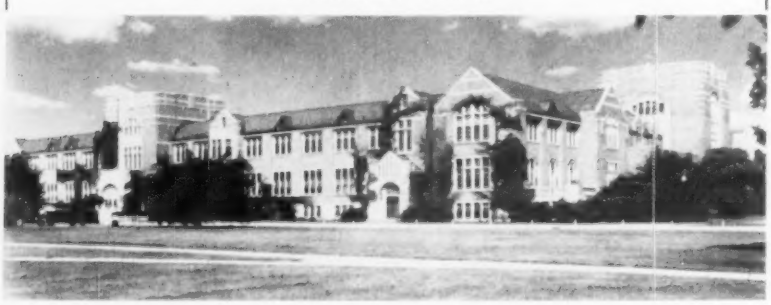
A keynote address by Garvin H. Dyer, president of the National Society, opened the session on Friday, March 7. Following this talk each of the Society vice presidents outlined his specific area of jurisdiction and the committees under his supervision to the assembled group in Purdue's Memorial Union.

Following regional luncheons, the state representatives were divided into six groups with the Society vice presidents then rotating from room to room to lead the discussions.

The Professional Development discussion was led by Vice President Clark A. Dunn. Among the subjects touched upon in this group were the role of the state and chapter in vocational guidance, professional development of young engineers, registration laws, and education.

Vice President W. L. Hindermann headed the Professional Employment Group which discussed the role of the state and chapter in enforcing professional ethics, functional sections, and engineer in industry programs.

Memorial Union



The Memorial Union building at Purdue University was the site of the National Society's recent State Presidents' Conference.

The unity proposal of the American Institute of Electrical Engineers was one highlight in the Professional Relations Group, with Vice President Allan H. Kidder presiding. Intersociety relations and cooperative activities with other professional groups were also topics in this group.

The Public Relations Group, headed by Vice President John B. McGaughy discussed relations with the public in regard to Engineers' Week and means of promoting a broader participation in civic activities by Society members. Methods of publicizing NSPE at all levels and internal public relations were examined.

Vice President Lindley R. Durkee led the Organizational Functions Group on matters concerning membership campaigns, chapter and state publications, the problem of programs, and how to attract the newly-registered engineer.

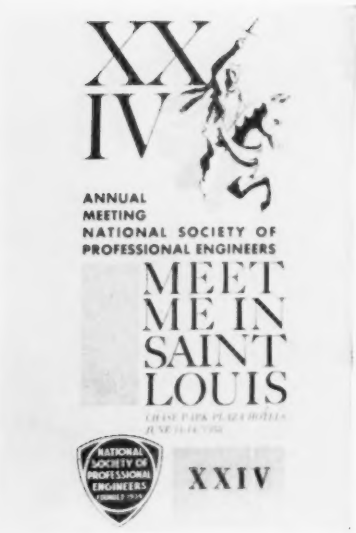
In the absence of Vice President Harry G. Kennedy, who was unable to attend, NSPE Executive Director Paul H. Robbins presided over the Policy Operations Group. This group covered state and chapter administration plus means of financing society operations. Such subjects as how the state president can most effectively serve his society and what are the criteria for selecting committee members were discussed.

A banquet was held to conclude the opening day's agenda. A talk on "The Engineer-in-Training Program" was given at this affair by Prof. H. L. Solberg, head of the School of Mechanical Engineering at Purdue University. He is a NSPE member.

Prof. H. L. Solberg Talks at Banquet

The representatives reconvened at eight a.m. on Saturday morning to continue the individual group discussions, which was followed by a meeting of all the delegates. The entire group then held a lengthy question and answer session presided over by President Dyer.

At a closing luncheon NSPE's president thanked the host Lafayette Chapter and the Indiana SPE for their efforts in making the conference a success. Executive Director Robbins closed the session by summarizing the discussions of the group.



Meet Me in St.

WHEN members of the National Society assemble in St. Louis, Mo., on June 11-14 for the annual meeting, they will find themselves at the traditional "Gateway to the West" with a colorful background unrivaled by any other city in the Midwest. With this thought in mind, many members will no doubt combine business and pleasure by planning a vacation to correspond with the meeting dates.

Although the official program has not been released, E. W. Butler, general chairman of the Executive Board in St. Louis, reports that the Board and all of the various committees have made considerable progress toward a large and successful meeting. A full schedule of activities is planned from the opening NSPE Past Presidents' Dinner on the evening of June 11 to the banquet finale June 14. NSPE President Garvin H. Dyer will speak on "The State of the Society" at the latter affair.

The annual banquet will feature

Dean Dougherty

the presentation of the 1958 NSPE Award to Nathan W. Dougherty, dean emeritus of engineering at the University of Tennessee. Dean Dougherty, a nationally-known figure in professional circles, will be the eighth individual to receive the Award since it was first made in 1949. The others were: Herbert Hoover, 1949; David B. Steinman, 1952; Charles F. Kettering, 1953; Harry A. Winne, 1954; A. A. Potter, 1955; Donald A. Quarles, 1956, and Granville M. Read, 1957.

A graduate of the University of Tennessee in 1909, he returned to his alma mater in 1916 where he served until his retirement in 1956, first as department head in civil engineering, and from 1940 to 1956 as dean of the College of Engineering.

After forty years as a member of the faculty of the College of Engineering at the University of Tennessee, Dean Dougherty has retired and is currently involved in consultation work for the Arnold Engineering Development Center.

Dean Dougherty acted as chairman of the Tennessee State Board of Examiners for Architects and Engineers from 1927 to 1957. He is a past president of the National Council of State Boards of Engineering Examiners, a past president of the American Society for Engineering Education, and a past vice president and national director of NSPE.

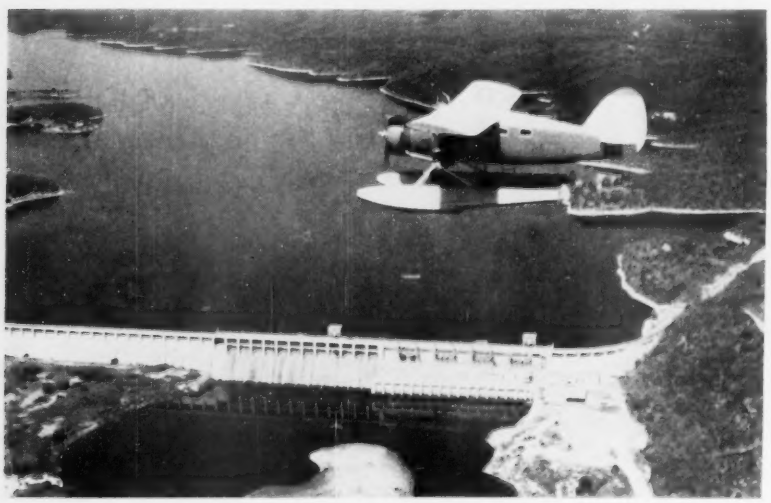
The theme for the twenty-fourth annual meeting is "Engineering Extends Man's Horizons," and all sessions will be held at the Chase-Park Plaza Hotels.

The Exhibit Committee headed by Arthur A. Kasper reports that there still is ample exhibit space available for companies to display their products. The highlight of the exhibits thus far is the Leonardo daVinci Exhibit, furnished by the I.B.M. Corporation.

Program plans are still in the tentative stage, according to Chairman Butler, with professional meetings set for Thursday morning, June 12. Following regional luncheons, the meetings will continue through the afternoon. And in the evening, a dinner and dance on the air-conditioned steamer, U. S. S. Admiral, is planned. A buffet dinner will be served aboard.

A series of functional sections meetings is slated for Friday, June 13, which will be of vital interest to engineers in private practice, industry, education, and government. Professional meetings will continue on Saturday.

An outstanding program for the ladies is being arranged. Mrs. E. W.



Shown is an aerial view of the Lake of the Ozarks and Bagnell Dam. Members planning to combine their vacation with NSPE's meeting will no doubt visit here.

St. Louis! — June 11-14

Butler, wife of the general chairman, is heading the Ladies' Committee.

For those who intend to combine their vacation with the meeting, there is much to offer in St. Louis from Shaw's Garden (Missouri Botanical Gardens), major league baseball at Busch Stadium, plus fishing, boating, and water skiing on Lake of the Ozarks about 100 miles southwest of St. Louis.

Incidentally, the St. Louis Cardinals meet the World Champion Milwaukee Braves in St. Louis, June 13, 14, and 15. Those planning to arrive early in St. Louis will find games on tap June 10, 11, and 12 between the Cardinals and Cincinnati Red Legs.

The May issue of the AMERICAN ENGINEER will carry the complete program for the meeting with the names of several well-known speakers scheduled to appear.

Combine Business and Pleasure

A large swimming pool is located at the Chase-Park Plaza Hotels—site of the meeting—for the convenience of the aqua-minded.

Here is a picture of St. Louis Mayor Raymond R. Tucker with the 1958 NSPE Meeting Committee. They are, l. to r.: Clyde S. Hale, Program Committee chairman; Jack Harvie, first vice president, St. Louis Chapter; Paul Q. Olschner, promotion and publicity chairman; E. W. Butler, general chairman; A. A. Kasper, exhibits chairman; Mayor Tucker; M. E. Taylor, reception chairman; C. W. Schemm, president, St. Louis Chapter, and Marshall Burton, meeting room chairman.

S-t-a-n t-h-e M-a-n

Three times the National League's Most Valuable Player, Stan Musial has a sixteen-year major league batting average of .340. He will be appearing with the St. Louis Cardinals in June at Busch Stadium.

1958 National Engineers' Week Highlighted by Many Events

TESTIMONIAL dinners, scholarship awards, career conferences for high school seniors, and talks before civic groups made up some of the major events of the 1958 National Engineers' Week program throughout the country.

As the pictures on these pages indicate, the eighth annual observance of the Week under NSPE sponsorship was highlighted by a variety of projects at the local and state levels.

At a District One banquet of the North Dakota SPE it was announced that funds had been raised for a total of twelve scholarships to be awarded this year. Awards of recognition to four top engineering students at the University of North Dakota were also made at the banquet.

Our first President was pictured as the centerpiece of this window display for the Week in Fairmont, West Virginia.

In Chicago, radio and TV coverage for the Week was emphasized. Special programs and spot announcements were carried over radio stations WOPA, WGN, WLS, and WEAW. Films, slides, and announcements were presented all during the Week on TV stations WBBM, WNBQ, and WGN.

In Cincinnati, Dr. Howard K. Justice, dean of the College of Engineering, University of Cincinnati, was chosen "Engineer of the Year." In Fort Worth, Texas, the same honor was given to Frank W. Davis, chief engineer for Convair-Fort Worth. C. Ray Huffman, retired Monongahela Power Company executive, was named for the honor by the Fairmont Chapter of the West Virginia SPE.

A school visitation program sponsored by the Central Indiana Chapter of the Indiana SPE resulted in reaching 7,000 students in seven high schools. The schools were visited by two-member teams who distributed more than 500 copies of the NSPE booklet, "Engineering—A Career of Opportunity." For these visits Westinghouse Electric, Allison Division of General Motors, and the Indiana Bell Telephone Company provided engineering demonstrations.

In Birmingham, Alabama, a radio panel discussion sponsored by the local chapter resulted in direct participation by the radio audience. On this three-hour program a panel of three engineers were introduced, and each panelist discussed his engineering activities. The panel was then opened for telephone questions from the audience. A total of fifty-three questions were answered, including inquiries concerning the purpose of registration, the reasons for Engineers' Week, the opportunities for careers in engineering, and the high school requirements for admission to engineering school.

Three high school groups and six civic organizations were treated to showings of the film "American Engineer"

Seven busy engineers in Dallas, Texas, take time out for some last minute planning for the Week. Left to right are J. R. Cameron, Louis Jay, George Prince, William Gahr, Charles Applegren, James Younce, and Joseph Antonio.

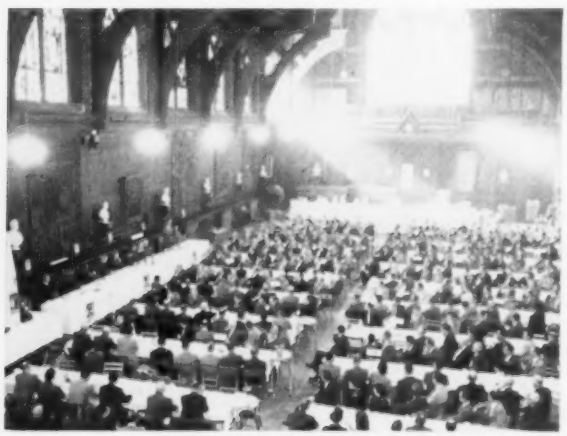
by members of the Tullahoma Chapter of the Tennessee SPE.

The Georgia SPE presented a plaque to the Georgia Institute of Technology in memory of the late Roy Stevenson King, director of the department of mechanical engineering. The Georgia chapters also coordinated the visit of fifty high school seniors to the Georgia Tech campus. In the same state, the 151st Engineer Group from Fort Benning set up displays of combat engineering equipment in Columbus.

In Columbus, Nebraska, the Columbus Chapter of the Nebraska SPE achieved a 10-point program for the Week:

1. A career conference at the Columbus City Auditorium which was attended by 200 students from twenty-three schools in Northeastern Nebraska.

Phil M. Ferguson, right, first vice president of the American Concrete Institute, accepts an award as "Outstanding Engineer of the Year" from Tom K. Wood, president of the Travis Chapter of the Texas SPE. Looking on is J. Neils Thompson, NSPE national director. ►



Memorial Hall at Harvard University was the scene of a luncheon session for more than 500 guests during National Engineers' Week.

George Keenan, mayor of Corning, N.Y., looks over a poster for the 1958 Week with Walter Smith and James Moore, both of the Steuben Area Chapter of the New York State SPE.

Colorado Governor Steve McNichols, seated, hands an Engineers' Week proclamation for the State to E. W. Thorson, president of the Professional Engineers of Colorado. Others left to right are Al Swanson, John E. Tracy, and Vernon E. Kunkle.

In Honolulu, Hawaii, a sugar machinery exhibit was part of the Engineers' Week observance. Shown with the exhibit is J. Roberts Britton, superintendent of the operating division of the Hawaiian Electric Company.

A Boston area luncheon during the Week was the occasion for honoring Dr. Carl S. Ell, second from left, president of Northeastern University, as "Outstanding Engineer of New England."

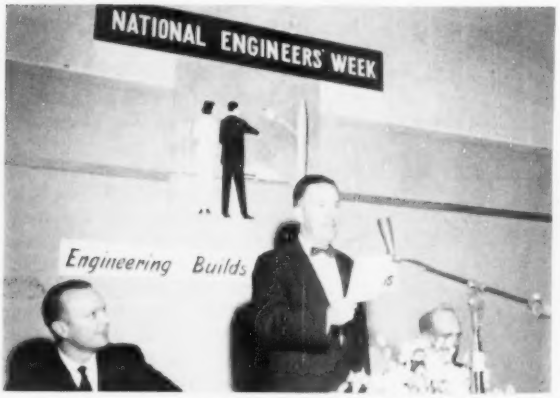
Indiana's Governor Harold W. Handley signs an Engineers' Week proclamation for his State as four engineers from that State look on. Left to right are Ferdinand Jehle, secretary, Indiana Board of Registration for Professional Engineers and Land Surveyors; M. C. Boyer, chairman, Marion County Engineers' Week Committee; Robert P. Loveland, president, Indiana SPE, and Clyde E. Williams, president, Indiana Engineering Council.

2. A special Engineers' Week supplement published in the *Columbus Daily Telegram*.
3. TV slides and spot announcements used throughout the Week on station KOLN-TV, Lincoln.
4. Two tape recorded programs and spot announcements used on Columbus radio station.
5. Two window displays, one developed by the members of the Columbus Chapter, and the other by high school students belonging to the local JETS.
6. Two thousand Engineers' Week seals sold in the Columbus area.
7. Posters, copies of President Eisenhower's letter concerning the Week, and information on the career conference mailed to eighty-five schools.
8. Copies of the Engineers' Week booklet published by NSPE distributed to local industrial firms.
9. Two hundred copies of the booklet "Engineering—A Career of Opportunity" distributed to high school students.
10. A speaker's bureau made up of members of the Columbus Chapter sent engineers to talk before local civic groups, including the Lions Club, Rotary, and the Toastmasters.

Some 800 engineers affiliated with the Toledo Technical Council attended an Engineers' Week banquet in that city at which a check for $3,000 was presented to the University of Toledo. The sum represented donations from the sixteen engineering societies comprising the Council. The affair also featured the presentation of certificates of merit to sixteen Toledo high school students for their scholastic excellence in science and mathematics.

A judging committee made up of distinguished professional engineers selected the winning essay in a $1,000 scholarship competition sponsored by the Nassau County Chapter of the New York State SPE. The judges were Dr. J. J. Theobold, president of Queens College; Monsignor Ronald MacDonald, chairman of the Building Commission of the Long Island Diocese; James W. Carpenter, former vice president and now consultant to the Long Island Lighting Company; Professor Edward J. Squire, retired dean of engineering at Brooklyn Polytechnic Institute; and Dr. D. B. Steinman, bridge consultant.—**End.**

Governor Price Daniel of Texas signs his proclamation designating Engineers' Week in the Lone Star State. Left to right are Gus F. White, Tom K. Wood, and J. Neils Thompson.



Senator Henry M. Jackson of Washington takes to the microphone for an Engineers' Week talk. Seated left to right are J. R. Carrell, president, Pasco Chapter, Washington SPE, and W. E. Johnson, general manager of the Hanford Atomic Products Operation of General Electric Company.

K. M. Irwin, second from left, receives his award as "Engineer of the Year" in Philadelphia from N. T. McHugh, chairman of the Week in that city, and A. H. Kidder, NSPE vice president. At right is C. C. Chambers, president of the Philadelphia Chapter of the Pennsylvania SPE. ►

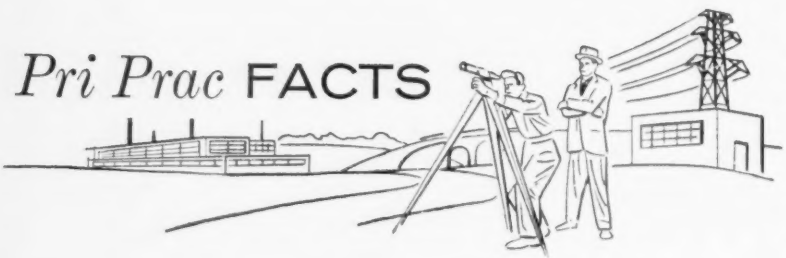
Major General Charles G. Holle, special assistant to the Army's chief of engineers, shakes hands with Charles D. Curran, president of the District of Columbia SPE. At right is Colonel Alvin C. Welling, engineer commissioner for the District of Columbia. ►

A prize-winning essay entitled "The Future in Engineering for Me" won Richard L. Parson, left, Madison, Wisconsin, a $25 U. S. Savings Bond in a contest sponsored by the Wisconsin SPE. David E. Aspnes, right, received a scholarship award for his 4.00 grade point average during his freshman year at the University of Wisconsin. In the background are C. George Extrom, left, and A. Ahern, both of the Madison Chapter.

Ernesto de la Guardia, Jr., at microphone, president of the Republic of Panama, addresses an Engineers' Week dinner dance at the Tivoli Guest House, Ancon, Canal Zone. ◄

H. L. Brantley, left, president of the Capital Chapter, Illinois SPE, hands a guest ticket for that group's All Engineers Banquet to Nelson O. Howarth, mayor of Springfield, Illinois. Looking on left to right are Aldo Reid, president, Springfield Chapter, Illinois Association of Highway Engineers, and Emil L. Tiona, past president, Springfield Engineers Club. ◄

Pri Prac FACTS



THE spring meeting of the NSPE Board of Directors at Michigan State University was reported in the AMERICAN ENGINEER last month, as was this Section's report to the Board. Not noted, however, were some of the items discussed by the Section's Executive Committee. Vice Chairmen Genovese, Gates, Pierce and Veenstra, Secretary Sanford and Chairman Kirkwood were present as was Arlow Ferry of TF4—Professional Liability Insurance.

Last fall, at Bismarck, there were discussions regarding both premiums and policy features. At East Lansing the Task Force reported much progress. As experience records are compiled from a year of operation plus acquired knowledge of the prior experience of policy holders, it has become apparent that premium rates can be adjusted downward in many cases and that some coverage features may be improved.

Much discussion was given to the subject of ethics, what is done by and what should be done about those few who knowingly or carelessly violate the approved tenets. Specific instances considered emphasized the need for a better appreciation of facts and requirements by all concerned. TF 3 is pursuing this matter in its studies and NSPE's Ethical Practices Committee is likewise investigating.

The subject of a roster of consulting firms, principals and key engineering employees was discussed at length. None exists although partial rosters are available in some areas. Through this page it is proposed to assist, urging voluntary response by willing members in each chapter area. The basic data can be quickly assembled by chapter areas by these willing volunteers. Data should be forwarded to the Section's Vice Chairmen for the appropriate administrative area, as follows:

Phillip W. Genovese, 294 Elm Street, New Haven, Connecticut

NORTHEASTERN AREA

Connecticut, Delaware, District of Columbia, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont.

Harvey F. Pierce, P. O. Box 726, Riverside Station, Miami, Florida

SOUTHEASTERN AREA

Alabama, Florida, Georgia, Mississippi, North Carolina, Puerto Rico, South Carolina, Tennessee, Virginia.

Leslie C. Gates, P. O. Box 672, Beckley, West Virginia

CENTRAL AREA

Illinois, Indiana, Kentucky, Michigan, Ohio, West Virginia, Wisconsin.

H. R. Veenstra, 1303 Smalley Avenue, Muscatine, Iowa

NORTH CENTRAL AREA

Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, South Dakota, Wyoming.

N. P. Turner, Jr., 2111 C & I Life Building, Houston, Texas

SOUTHWESTERN AREA

Arkansas, Colorado, Louisiana, New Mexico, Oklahoma, Texas, Canal Zone.

Kendall M. Wood, 217 Hutton Building, Spokane, Washington

WESTERN AREA

Alaska, Arizona, California, Hawaii, Idaho, Montana, Nevada, Oregon, Utah, Washington.

The Section believes that by this means the essential roster will be compiled promptly.

* * *

This Section will complete its second year in June. The annual meeting in St. Louis will afford each section participant an excellent opportunity to join fellow consultants (employers and employees) in discussions of direct concern to this segment of the profession. An invitation is extended to all consultants. Plan to arrive in St. Louis on June 12 so as to be present at breakfast June 13 as well as throughout that day. There will be both your business "bread and butter" discussions and business (section) sessions in the morning. Top flight speakers will take over in the afternoon. (Details next month.)

One of the important business items will be the election of officers. The Nominating Committee will report on June 13 and the election will be held immediately thereafter. The Nominating Committee will welcome advance suggestions. They may be sent either to Paul H. Robbins at NSPE headquarters, or to A. C. Kirkwood, 7800 Paseo, Kansas City 10, Missouri, for transmittal to the Nominating Committee. (It will be appointed in mid-April.)

* * *

During the St. Louis meeting the Section will receive the report of TF 2 concerning a "Compendium of Fees." Chairman Sanford of this task force and the consultants working with him will have an up-to-date statement of fees, terminology and application data for the several states. Participants will be asked to consider this document by itself and potentially as the basic portion of a manual also to contain (1) the EJC Report 106 (Manual on Consulting Practice) which the Section helped prepare by having Vice Chairman Leslie C. Gates as the NSPE representative and Secretary Frank Sanford as alternate for AIEE, and (2) such NSPE-AIA and other interprofessional agreement forms as are approved by the Board. This compendium and, if approved by the Section, the complete "Manual" will be of great assistance to consultants.

Considerable expression has been made that one subject for discussion should concern the delineation of "payroll costs." Those offering this suggestion hope that out of the discussion will come a codification that will ultimately encourage the use of a single standard of expression in contractual agreements. The compendium will be a valuable assistance in this matter.

* * *

The American Thrift Assembly continues its efforts to secure enactment of the Jenkins-Keogh Bills. As one of the sponsoring groups, NSPE and its members are aiding financially in this effort to make available the basis for retirement plans for self-employed professional people. Collections this winter have amounted to $2,500, as of March 10, 1958. If you care to assist, please mail your contribution to NSPE in Washington, D. C.—**End.**

Society Testifies Before House on Classified Pay Increase Proposals

The following is testimony presented recently by the National Society of Professional Engineers before the Committee on Post Office and Civil Service of the House of Representatives in regard to classified pay increase proposals.

THE National Society has been seriously concerned in recent years over the inability of Governmental agencies to recruit and retain adequate numbers of highly qualified scientists and engineers. In many instances, activities and programs have been seriously curtailed or hindered by the loss of key employees, usually in Grades GS-12 and above. This situation has led to the undertaking of several surveys, studies and reports which have recommended, among other things, immediate raises for scientific and engineering personnel, increased fringe benefits, higher starting grades and a certain degree of flexibility in the Federal salary structure. While these proposals certainly have a great deal of merit as short term expediencies, a final, long-lasting solution to this serious personnel problem can only be achieved by the establishment of a program which has been noticeably absent or minimized in most of the surveys and studies conducted thus far. We refer to the establishment of a "Professional Engineering-Scientific" compensation and classification schedule, the principle of which is currently before this Committee in the form of the Moss-Gubser Bills, H. R. 2803 and 2804.

The National Society has consistently and strongly supported and endorsed the creation of a separate schedule for Federal engineers and scientists as the preferred method for alleviating the current situation. We believe that such a long-range ultimate program would provide the essential prestige and recognition which our qualified, conscientious Federal engineers so rightfully deserve, and which is an irreplaceable element in their proper professional development. By reason of their advanced training and adherence to a commonly accepted ethical standard imposed by the profession itself as a matter of self-discipline in the public interest, professional employees have come to place a high emphasis on their identification apart from strictly occupational classifications. This separate identification is an important ingredient in maintaining and enhancing the morale and service of the professionals.

It is significant to note that a recent attitude survey of scientists and engineers conducted by the Committee on Engineers and Scientists for Federal Government Programs indicates that eighty-seven per cent of the scientists and engineers in the Government feel that a separate category for professional employees would aid in recruiting and retaining professional employees.

The National Society has urged the adoption of this long-range Federal program for professional recognition of scientists and engineers in statements and letters to various Congressional committees and Federal agencies. In fact, only recently Chairman Murray has requested the Society to recommend the means by which this separate classification program could be restricted to professional employees only, in order that the true objectives of this program can be accomplished with a minimum of conflict and confusion. We are, of course, pleased to cooperate to the best of our ability. Our suggestions and recommendations are currently being formulated, and will be presented to Chairman Murray shortly.

We believe that until such a "Professional Engineering-Scientific" schedule is established, the Federal Government should do all within its power to elevate the salaries of Federal scientists and engineers to a level which is more closely equal to the salaries currently being received by their counterparts in industry and other areas of employment. In this connection, the Society naturally supports and favors Federal classified pay raise legislation which, based on sound economic factors, is equitable and just. However, we have been greatly disturbed by language in several pay raise proposals currently before the Congress which would deny the full benefits of an over-all classified pay raise to those engineers and scientists who have been raised to the top step of their grade as a result of the recent Civil Service Commission orders. It is our understanding that many of these individuals would receive only a token increase inasmuch as their present salaries would be fixed to the nearest rate in the new schedule. Most would probably be granted varying increases, depending upon the amount received under the Civil Service orders raising them to the top step of their grade. None would receive the full classified pay raise finally approved by the Congress, except those engineers and scientists who had reached the top step of their grade through normal procedures and who were not affected by the Civil Service orders.

The National Society believes that such a limiting provision could prove seriously detrimental to the morale of our Federal engineers and scientists and result in an even higher resignation rate from Federal service. Rather than restrict engineer-scientist benefits as indicated in the language of the proposed measures, we suggest that such employees retain their present classification top of the grade step and be afforded the full benefit of any classified pay raises approved by the Congress. The action that we favor, which is designed to permit the Federal Government to raise the salary level of its engineers and scientists more in line with comparable salaries offered in industry and thus enhance its competitive position for essential manpower, has been endorsed in principle by the Cordiner Committee and the Committee on Scientists and Engineers for Federal Government Programs.

The Cordiner Report has specifically recommended an immediate pay adjustment of the present salary line of professional grade levels as close as practicable to comparable industry scales in order to hold together the present work force. The recent Civil Service order, closing the 15-20 per cent gap between Federal and industry-wide salaries for engineers and scientists, represents an awareness by the Government that these employees are deserving of an immediate pay adjustment.

Should these engineers and scientists who received interim increases under the Civil Service order be denied further complete benefits under classified pay

(Continued on page 42)

Corrections . . .

On page 18 of the February issue of the American Engineer the statement made in answer to question IX was incorrectly attributed to Major General Emerson C. Itschner. The statement was actually made by Norman V. Petersen.

Also, somehow in the compilation of the state registration boards for the February issue, the Republic of Panama was included. It should not have been carried in the listing.

The American Engineer regrets these errors.

N.S.P.E. Believes

Should Young People Be Encouraged to Study Engineering?

By Paul H. Robbins, P. E.

Executive Director

N. S. P. E.

THE title of this column poses a question uppermost in the minds of many engineers during the past several months as individuals, and the NSPE chapters have been called upon to meet with high school students in vocational guidance clinics and discussions. Even within engineering circles there have been comments and soul searching as to the balance between the needs of the nation, and the fear that a lowering of standards of the profession may result by over-encouragement of young people to enter engineering careers. Indeed, some cogent arguments can be presented both for encouraging young people to take up engineering, as well as urging words of caution.

Some of the older heads of the profession who recall the problems of the depression years of the 30's feel that many of the problems we face today were generated in those trying years when engineers could not find engineering work, and if employed at all it was on manual jobs rather than those for which they were trained. They contend this discouraged young people for the next decade from entering engineering study. They go on to point out that should a similar situation occur in the next ten or fifteen years, with the increasing dependency of the nation on technological brainpower, this would be a most disastrous result of the publicity today concerning our need for engineers and scientists. Others will point out that the current publicity has made it popular to be an engineer and that unless we urge caution our engineering schools and the profession of the future, may well count among its numbers many young people only partially interested in the profession, who will be both dissatisfied and poor engineers.

On the other hand, the long-range viewpoint of the needs of our nation indicate three pressures requiring solution by engineering brainpower. The much-publicized one of the moment is the defense needs of our nation. While it is recognized that the exploration of space has many defense angles, the much broader concept of the tremendous advances in scientific knowledge which will be gained in the next few years as the result of the break-through of this new frontier, makes it evident that we will have great need for those who understand basic scientific and mathematical principles to interpret these new concepts for the welfare of man.

The second great pressure is the exploding population of our nation and the world which will need to be clothed, housed, and fed, thus challenging the abilities of the engineers to produce the goods and services this population will need. If we are to continue to maintain our standard of living and to provide more leisure hours for our people, it will be up to the engineers and scientists to produce the necessities and luxuries of life with a continually decreasing requirement for manpower. This is the challenge facing engineers of the future.

The third pressure arises from the shrinking distances that encompass our world. We are becoming ever inter-dependent, and the continuing of our free-world philosophies may well be tied up with the ability of the free world to provide its peoples with the necessities of life—again, a challenge to the engineering profession.

Those who look at this long-range point of view believe that there will be an ever-expanding need for engineers and that we would do well to train all who have capabilities and desires to enter the profession. One of the grave dangers, however, regardless of which point of view is valid, would be our failure to put first things first. NSPE believes that we would be doing a great injustice to future generations if our decisions in these critical times in any way jeopardize or lower the standards of the profession. With our increasing reliance on technology, it is essential that we maintain our standards of both education and performance in the profession, such that they become an ideal for the young of tomorrow rather than something that is easily attained.

It is this thinking which undergirds NSPE's several statements of the last few months urging caution in extensive steps for stimulating more young people in engineering and science. Until we have better established the definitions of who is an engineer, and what that person is expected to do, we are laboring under severe difficulties in the predictions of requirements of our nation. Until we have provided the facilities, and particularly the teachers, to adequately train our young people in engineering careers, NSPE believes it unwise to artificially stimulate the number of youths seeking such education. Until we have better established the utilization of our existing engineering and scientific brainpower and created a clear line of distinction in jobs requiring engineering degrees as against those which can be done with lesser training, we will continue to have problems in the definition of our profession and in the requirements both as to numbers and extent of skill needed.—**End.**

With Our Members . . .

Bill S500

Central Mass. Chapter Endorses Mandatory Registration Law

Walter J. Kreske, chairman of the Massachusetts SPE Legislative Committee and NSPE national director, explained the intent of legislative bill S500 filed with the Massachusetts Legislature for passage in the current session at a well-attended recent meeting of the Central Massachusetts Chapter.

Since the Commonwealth of Massachusetts has the dubious distinction of standing alone as the only State of the forty-eight without a Mandatory Registration Law for Professional Engineers, Mr. Kreske, who is a practicing patent attorney as well as a consulting professional engineer, explained the efforts of MSPE and other leading founder and technical societies in the State in promoting the passage of the proposed mandatory amendment to the present registration statute. The new law will closely adhere to the Model Law endorsed by every major engineering organization in the United States.

The Chapter has appointed a special committee to actively promote passage of bill S500 to put Massachusetts, long recognized for its outstanding engineering colleges, on an equal footing with other states in regard to mandatory registration.

The Committee includes: Acting Chairman: F. A. Conery, Jr., consulting engineer; A. B. Holmstrom, vice president, Norton Company; R. N. S. Merritt, product safety engineer, Norton Company; R. G. MacIntyre, services & utilities superintendent, Norton Company, and J. F. Gallagher, Massachusetts Department of Public Works and vice president, Massachusetts State Engineers Association.

At this meeting, Nathan Wiseblood, chairman of the State Civic Affairs Committee of MSPE, discussed benefits to be derived by the public and professional engineers by the latter taking a more active part in civic affairs at all levels.

Lt. J. J. McCambridge Gets Air Force Ribbon

Strategic Air Command Headquarters announced recently that the Air Force Commendation Ribbon has been awarded to First Lieutenant John J. McCambridge, E. I. T., junior member of Kings County Chapter of the New York State SPE.

Lt. McCambridge was cited for his work on a number of projects.

NY Chapter Sponsors Newspaper Articles

The Central New York Chapter of the New York State SPE recently sponsored a series of four newspaper articles in the Syracuse *Herald-Journal*. The series was directed toward boys and girls in junior and senior high school and their teachers, parents, and counselors. It was the intent of these articles to help promote an understanding and an active interest in the various fields of engineering.

The panel of authors consisted of Dean Ralph A. Galbraith of Syracuse University, Dr. W. R. G. Baker of Syracuse University, Earl F. O'Brien & Gere, Consulting Engineers, and Newell L. Freeman, secretary of the New York State Board of Examiners of Professional Engineers and Land Surveyors.

Texas SPE Holds Annual Meeting

Left photo: NSPE President Garvin H. Dyer, left, talks with H. C. Havron, chief control engineer for the Thiokol Chemical Corporation, during the recent annual meeting of the Texas SPE. Mr. Havron told the group at a luncheon that atomic propulsion for missiles is a certainty. *Right photo:* New TSPE president, Waldemar H. Sindt, is flanked by new vice presidents, Frank H. Newman, Jr., left, and O. T. Lodal, following installation ceremonies. Outgoing TSPE President Gibbs A. Dyer, (left, standing) and NSPE Pres. Dyer look on.

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Miami Chapter Takes Part in Experiment

The Miami Chapter of the Florida Engineering Society, in cooperation with the Miami Section of the American Society of Civil Engineers, recently undertook an experiment in engineering education. Five high school seniors were awarded scholarships by the local engineering groups in a surveying course at the University of Miami. The surveying course—consisting of five hours per week for the current semester—will run concurrently with the seniors' last term in high school.

The five high school students were picked on the basis of their outstanding scholastic record in high school, and on their potential to ultimately complete a full degree program in civil engineering. Students chosen were: Alvin Marrow, North Miami High School; Richard Coopersmith, Miami Beach High School; Ronald Maier, Miami Jackson High School; Richard Thigpin, Hialeah High School, and Joe Stryhal, Miami High School.

Engineering Enthusiasts

"This will be fun," says Engineering Professor James P. Sampson, University of Miami, "but don't try to find our earth satellites with it." On their first field trip with surveying instruments are, l. to r.: Ronald M. Maier, Richard W. Coopersmith, Alvin J. Marrow, Joseph B. Stryhal, Glen Buckles, and Richard O. Thigpin.

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New York State SPE Hears Power Plant Talk

John P. Otteson, project engineer for construction of the new $600,000,000 power plant at Niagara Falls, N. Y., spoke at the winter meeting of the New York State Society of Professional Engineers held in Buffalo during Engineers' Week.

Mr. Otteson showed colored pictures and gave a very interesting talk about a $100,000,000 power plant in Turkey, for which he had been sent overseas as project manager of construction.

Neff, Hindman Receive Award at Ohio Meeting

One of the highlights of the annual meeting of the Ohio Society in Cleveland in March was the presentation of a citation and award to Allison C. Neff, of Middletown, and Thompson F. Hindman, of Cleveland. It is the Ohio SPE's highest honor.

Mr. Neff is a past president of the National Society.

Meeting in New York

Taking a prominent part in the NYSSPE winter meeting were Frank Johnson, New York State president, John P. Otteson, guest speaker, and Clair Dean, president of the host Erie County Chapter. (See story at left.)

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(Continued from page 12)

the war many problems of cooperation were solved during late night sessions wherever it was convenient to get together. No doubt some of the get-togethers were not strictly in the direct interest of national defense, and, as a result, military personnel now consider it very risky to their careers to be seen in the company of industry personnel outside of their business offices. Even organized and programmed meetings have been curtailed.

Thus, the close cooperation that exists between industry and its civilian customers is largely missing with respect to its military customers.

We have already touched upon project controls. The differences can be stated briefly. Civilian business operates under generally applicable laws with violations punishable by economic and other penalties. In military procurement a cumbersome system of detailed scrutiny and approval requirements is used in an attempt to prevent all mistakes and violations of rules and laws. The direct cost of this machinery shows up in the form of extra government payroll and expenses, but the indirect cost in lost time and production of industrial work done under the system represents a hidden but huge item in the Federal budget.

On top of all this, the profit incentives for doing military work are a fraction of what they would normally be for civilian work. Moreover, these incentives are not usually related to quality of performance or the risks involved. Cost reductions almost invariably bring proportionately lower fees. If this isn't quite accomplished in the negotiation, it is in the renegotiation.

ALONG with the lower fees, the Government as customer normally claims rights over patents and proprietary information, which the civilian customer would not normally think of expecting, although civilian customers paid for industry's research and development program for many decades before defense was a significant factor, and are still paying the larger share.

Need any further explanation be given of why American private enterprise can do such wonders in civilian goods and have such difficulties with military equipment? American private enterprise is rarely given the chance to fully apply its world-renowned talents to the problem. In some few cases where it has been given the chance, the results have been startlingly successful. Normally, however, the conditions under which American enterprise engages in military products probably differs little from the early Soviet methods of highly-centralized bureaucratic control. There is significant evidence that the Soviets may have modified their earlier methods, particularly toward greater decentralization and more incentives. In the area of incentives, for instance, *Science News* carried a story recently about a Russian scientist, who is the most highly paid scientist in the world. Coercion alone is an unlikely explanation for their higher technical college enrollments.

In other ways they seem to have undergone a major relaxation from their rigid centralized controls of early post revolution days. While they have been relaxing theirs, we have been tightening ours in a great many ways, and we can no longer be sure that they are more highly centralized in important respects than we.

When our defense procurement system bogs down, as it almost always does in the face of major innovation, our invariable solution is another even earlier Russian invention —a czar who can most successfully do his job by cutting the red tape so that people can do what they have known all along they should and could do.

In the meantime, our private enterprise economy goes right on putting out its continuous succession of world civilian firsts and bests and mosts while we become more and more apprehensive of the status of our military weapons.

Our private enterprise could produce an equally unchallenged array of weapons at far less cost to the taxpayer. Private enterprise should be asked to do the job in the way they know so well that it can best be done.

To many industrial experts the adverse trend of the effectiveness of our weapons procurement has been obvious for a long time. Many Government experts see it too, but claim nothing can be done because the people won't sanction it. This just cannot be so. Any people who are as interested in defense as those in this country will certainly sanction doing it at least cost and with the greatest safety to their fighting forces.

THERE are some things that can be done now, and others after some study and planning:

1. Management, and particularly engineering management, will need to continually rededicate their efforts to forge ahead with weapon innovation in spite of current handicaps. At the same time, industry and engineering associations could make an outstanding contribution by establishing major programs to educate voters and their representatives locally and nationally on the importance of innovation to national security, and to demonstrate over and over again the necessity of applying our highly successful civilian product techniques to defense production.

2. Engineering and scientific organizations and companies can expand their efforts to awaken the American people, particularly the young people, to the importance and desirability of scientific and engineering careers. Effective methods have been evolved by industry associations, companies, and others to serve as starting points for a vigorous and successful drive.

3. Active business leaders, particularly from national companies of demonstrated growth, should comprise one of several separate panels to participate on a continuing basis in the formulation of plans and strategy for national defense technology. The management of innovation is no less difficult and complex than the technical work of research itself, and there is no substitute for successful experience in planning for the probable turns of technology, oftentimes before the necessary research results have been demonstrated. While such a panel could be expected to have the most valuable experience available for such planning, several such panels should be established such as one of military experience and one of scientific experience so that the Defense Department will have the benefit of multi-judgment and alternate approaches, thereby reducing the probability of single opinion errors.

4. All tactical objectives should be eliminated from research and advanced development programs. These should have as their objectives, instead, the demonstration of new basic scientific and engineering principles of possible use in weapon innovation. Small scale and indirect demonstrations of the new principles should be encouraged to the maximum extent technically acceptable. Conversely, research and development controls should be eliminated from all phases of production procurement, engineering, and improvement. Industrial experience has shown time and time again that research and advanced development is a major

(Continued on page 44)

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TESTIMONY

(Continued from page 33)

raise legislation, the partial accomplishment of the Government's objective, as evidenced by the action of the Civil Service Commission, would, as a practical matter, be nullified. The opportunity for the Federal Government to further close the gap between Federal and industry salaries for engineers and scientists through classified pay raise proposals, must not be cast aside by the presence of limiting provisions in the pending legislation.

It is essential to note that even according to the course of action that we advocate, Federal salaries would still remain below those paid in industry to persons holding positions comparable to the grades on the General Schedule.

. . .

The third biennial Professsional Engineers Income and Salary Survey for 1956, conducted by the National Society of Professional Engineers, indicates a twenty-one per cent median salary increase for all engineers over the four years from 1952 to 1956, as compared to a twelve per cent increase for Federal engineers over the same period. The over-all median salary for professional engineers increased twelve per cent from 1954 to 1956, whereas the percentage increase for engineers employed by the Federal Government amounted to ten per cent. Our survey figures further indicate that for 1956, engineers in the Federal service were paid at a rate twenty-one per cent lower than private industry. The complete Society Salary Survey is, of course, available, and we will be pleased to furnish a complimentary copy to you.

The National Society of Professional Engineers believes, and all will agree, that the Federal Government is entitled to the very best engineering and scientific talent obtainable. Correspondingly, there is an obligation upon the Government to adequately recognize and compensate these professional individuals who will now and in the future make such a vital contribution to our national welfare. Full and complete classified pay increases for engineers and scientists, over and above the increases granted under the Civil Service actions, will evidence this essential recognition by the Government.

Because of rapid technological progress and various external pressures, the American engineer and scientist today is in a unique position. Industry has long recognized this situation. The Government must also do so as soon as is practically possible. That time is the present.

We hope these recommendations and suggestions will be of some assistance to the Committee in its important deliberations concerning Federal classified pay raise proposals. We appreciate this opportunity of presenting the Society's view on this vital matter and look forward to being of further service in the future. As in the past, we stand ready to cooperate and assist to the fullest extent of our ability.—**End.**

SUBJECT LISTING OF NSPE PUBLICATIONS

(Unless otherwise indicated publications listed below are FREE and may be obtained by writing to NSPE, 2029 K Street, N.W., Washington 6, D. C.)

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Monographs outlining various chapter functions have been prepared for the use of chapters: **Helping the Young Engineer, Ladies Auxiliaries, Promote Ethical Practice, Chapter Publications, Functional Group Activities, Meetings, Fellowship, Attendance, Public Relations, Education—Key to the Future, Chapter Evaluation and Scoring System, and Indoctrination Conference for Chapter Officers and Committees.**

Welcome Mr. President—An informative booklet outlining organizational functions and suggestions for chapter presidents.

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***How to Improve Engineering-Management Communications**—Executive Research Survey Number One. Based on a survey of more than 300 companies employing engineers, this report contains information on engineering-management relations with respect to the lines of communication between engineers and management. Price $1.00 Members. $2.00 Non-members.

COMPETITIVE BIDDING

About Competitive Bidding—Reprint from American Engineer (NSPE Believes).

Competitive Bidding for Professional Services—NSPE Professional Policy Statement.

Recommended Procedure for Negotiating Engineering Contracts—NSPE Professional Policy Statement.

CONSULTING ENGINEERS

So You Want to Open a Consulting Office—Series of articles dealing with problems faced in opening a consulting office: **By Way of Qualifications**—John B. McGaughy, P. E., **Operating Your Practice**—Alfred J. Ryan, P. E., **Ethical Problems**—Francis S. Friel, P. E., Reprints from American Engineer, 20¢ each article—3 for 50¢.

CORPORATE ENGINEERING PRACTICE

Corporate Professional Practice vs. Individual Professional Practice—The Special Committee on Registration Law, NYSSPE. Reprint from American Engineer.

Should Corporations Practice Engineering?—Ronald B. Smith, P. E. and V. George Terenzio, P. E. Reprint from American Engineer. A discussion of the pros and cons of the issues involved in the debate over corporate practice of engineering.

CREED

Engineers' Creed—Suitable for distribution—free; for framing—50¢ each.

EMPLOYMENT PRACTICES

Criteria for Professional Employment of Engineers—Adopted by NSPE, June, 1956. 25¢ each.

Engineering Employment Practices Newsletter—Published monthly by NSPE; available to members upon request.

Survey Report—Engineers Employed by Private Practitioners—Covers salaries, hours, fringe benefits, etc., of engineers employed by consultants. Price 50¢ Members. $1.00 Non-members.

ETHICS

Canons of Ethics—Suitable for distribution—free; for framing—50¢ each.

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Recommended Grades, Duties, Responsibilities and Qualifications for Pre-Professional and Professional Positions—Adopted by NSPE, June, 1952.

Report on Fee Schedules—Revised October, 1956. A study of the Salary and Fee Schedule Committee of NSPE bringing together various schedules of fees and related practices of engineers in the consulting field.

FUTURE OF ENGINEERS

Engineers for the Future—Reprint from American Engineer (NSPE Believes).

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Professionalism or Unionism—Facing the Issue—Past President T. Carr Forrest, Jr., P. E. A discourse on the aspects of unionism for the professional. Reprint from American Engineer.

The Professional Engineer in Industry—Reprint from American Engineer (NSPE Believes).

The Professional Union—A Contradiction—Past President Clarence T. Shoch, P. E. A discussion of the development of engineers' unions and the reasons why unionism is incompatible with professionalism.

Criteria for Professional Employment of Engineers—Adopted by NSPE, June, 1956. 25¢ each.

Engineering Employment Practices Newsletter—Published monthly by NSPE; available to members upon request.

Engineering Team (The)—Reprint from American Engineer (NSPE Believes).

Professional Responsibility vs. Collective Bargaining—NSPE Professional Policy Statement.

***Career Satisfaction of Professional Engineers in Industry**—Latest in a series of Executive Research Reports on employment and professional problems concerning engineers in industry. Price $1.50 Members. $3.00 Non-members.

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Legislative Bulletin—Published monthly by NSPE; available to members upon request.

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***How to Attract and Hold Engineering Talent**—Executive Research Survey Number Three. This report reflects the experience of more than 200 companies which employ engineers and attitudes of 1,400 individual engineers who are employed in industry. Price $1.00 Members. $2.00 Non-members.

***How to Improve the Utilization of Engineering Manpower**—Executive Research Survey Number Two. This report pools the experience of more than 495 companies employing engineers on the subject of utilization of manpower. Price $1.00 Members. $2.00 Non-members.

MEMBERSHIP PROMOTION

Every Man a Debtor—Sixteen-page booklet explaining NSPE organization, programs, activities and objectives.

Membership Kit—This kit is available to membership chairmen and contains a general outline of membership campaign techniques and sample materials. Any of the publications listed in this outline are generally available for distribution to membership promoters as membership mailing pieces.

NSPE PHILOSOPHY

Engineering Societies of America—Paul H. Robbins, P. E., executive director, NSPE. Describes organization, programs, activities and objectives of NSPE. Reprinted from G-E Review.

Is Our Registration Requirement Limiting Membership?—Reprint from American Engineer (NSPE Believes).

Why a Professional Society?—Reprint from American Engineer (NSPE Believes).

NATIONAL SECURITY

Engineering Profession in National Security (The)—NSPE Professional Policy Statement.

ORGANIZATION

Model Constitution for Ladies Auxiliary Chapters.

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POLICIES, NSPE

Professional Policies—Compilation of all present NSPE policies as adopted by the Board of Directors.

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PROFESSIONAL DEVELOPMENT

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Professionalism in Industry: The Dow Story—Case history of professionalism in industry. Reprint from American Engineer.

PROFESSIONAL DEVELOPMENT

Conference Proceedings, Atlantic City, 1956 — Management-Professional Employee Relations, Professional Status of Engineers in Government Employment, Teaching Professional Concepts in our Engineering Schools, 10¢ each.

Du Pont's Engineering Department Takes a Forward Look at Professional Development—C. H. Evans, P. E. Reprint from American Engineer.

PROFESSIONALISM

How a Professional Attitude Can Be Instilled in Engineers—Dean W. R. Woolrich, P. E. Reprint from American Engineer.

Some Thoughts on Engineers and the Engineering Profession—Speech by Harry A. Winnie, P. E., vice president, General Electric Co. (Retired), presented at the 20th Annual Meeting of NSPE.

Significance of the PE Emblem.

PUBLIC RELATIONS

Engineers' Week—Reprint from American Engineer (NSPE Believes).

Our Public Relations Responsibilities—Reprint from American Engineer (NSPE Believes).

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REGISTRATION

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Is Our Registration Requirement Limiting Membership?—Reprint from American Engineer (NSPE Believes).

Next Step Registration—Informative pamphlet for engineering students and others on values and procedure for engineering registration.

Registration: Then, Now and Tomorrow—Frank H. Prouty, P. E., chairman, National Bureau of Engineering Registration. Reprint from American Engineer.

Professional Engineering Registration Laws—A compendium compiled by Alfred L. McCawley in cooperation with NSPE. Available from A. L. McCawley, Box 474, Jefferson City, Missouri—$8.75.

SALARY SURVEY

Professional Engineers' Income and Salary Survey—1952-1954-1956 statistics covering NSPE members. Price 50* each. Members. $1.00 Non-members.

STANDARD FORM OF AGREEMENT

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Unity for Professional Action—Reprint from American Engineer (NSPE Believes).

Professional Organization of Engineers—Reprint from American Engineer.

VOCATIONAL GUIDANCE

Do We Have Enough Engineers?—Reprint from American Engineer (NSPE Believes).

Engineering . . . A Career of Opportunity—A general vocational guidance pamphlet.

Engineers for the Future—Reprint from American Engineer (NSPE Believes).

List of Accredited Engineering Schools—Reprint from ECPD Annual Report.

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* Order from and remit to Professional Engineers Conference Board for Industry, 2029 K St., N.W., Washington 6, D. C.

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DEFENSE

(Continued from page 41)

job all by itself and if successfully accomplished cannot in any way be encumbered with the "fire fighting" type of engineering associated with production procurement.

5. An adequately secure national library should be established of all classified information, including a substantial qualified staff for summarizing, digesting, and reporting progress in classified technology to serve the same function as the nation's technical press serves regarding non-classified effort.

6. A national committee patterned after the Cordiner Committee should be appointed forthwith to completely study the problem of procurement policies and practices looking toward:

a. Elimination of cumbersome and ineffective "prevention" controls and substituting therefor "redress" controls.

b. Improved cooperation between Defense agencies and personnel with their industry counterparts at all levels.

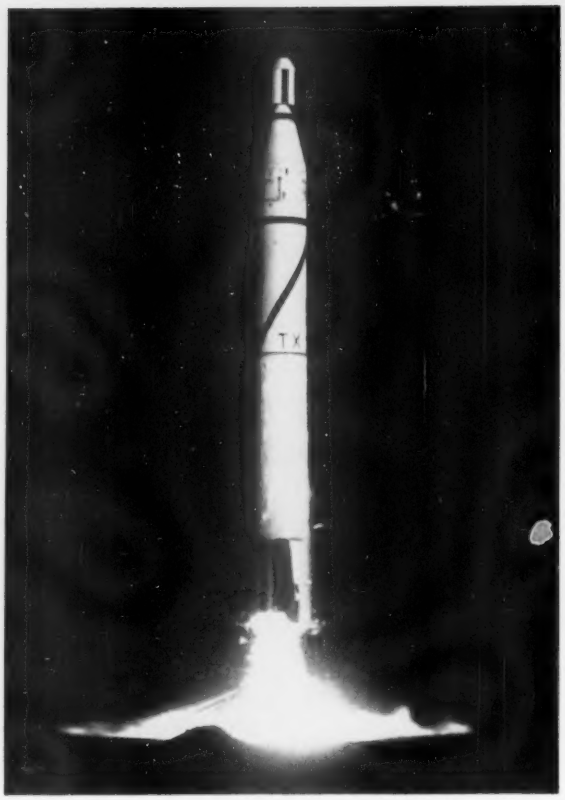
c. Permitting individual companies to accept full responsibility for the elaborate super-systems of today's and tomorrow's defense with full cooperation with the many other companies and industries necessary to bring together the diverse talents and capabilities required.

d. Attracting and applying adequate personnel, facilities, and methods to the job of efficient and prompt generation of technology and its application to defense.

During 1955 both the United States and Soviet Union announced to the world that they would put up an earth satellite as part of their programs to participate in the International Geophysical Year.

On October 4, 1957, the Russians met their commitment months ahead of the United States.

IN this country, support for the satellite program was tenuous indeed, and frequently lacking. Much of our defense effort suffers a similar fate. It isn't that we aren't interested but that we consider other things more important.



The Army's Jupiter C rocket in flight.

It is apparently more important, for instance, that we avoid all mistakes, particularly if they might become a political issue and subject to public exposure. We are extremely concerned that our defense contractors not make much profit out of defense work. We aren't willing to pay anywhere nearly as much for defense as we are for civilian goods. Many exert large efforts to prevent our companies from growing larger even though the defense jobs become larger and larger. We are fearful that one company, or that even one of the military services, might gain an advantage by having this program or that—or that an expert from industry might risk his life-long reputation and abandon his patriotism to favor a few shares of stock in his strong box, or that a military officer might sell his integrity for a cocktail or lunch.

If even one ballistic missile carrying a nuclear warhead is projected against any one of our major cities, these worries and concerns will then seem trivial indeed. But, at the moment, we are still acting as though we were more afraid of these trivia than we are of that eventuality.

I would not want to leave the impression that any of us consider private industry 100 per cent efficient. All industry managers, engineers and others know better. The modern integrated mass manufacturing and assembly lines are very possibly the most efficient human operations to date. Yet, there is still much room for improvement. For development operations; mistakes, errors, and inefficiencies are more frequent than not. In our quest for better methods and knowledge we invariably do more wrong things than right.

Nevertheless, the over-all score is by all odds the best that has yet been achieved. For American private enterprise has demonstrated repeatedly a world renowned performance in supplying its civilian customers with the most advanced technological products. Its over-all results in this area are unchallenged.

It can do equally well for national defense whenever the nation allows it to apply the procedures and processes which it has learned so well.—**End.**

About the Author . . .

Mr. LaPierre

C. W. LaPierre is a vice president and group executive of the General Electric Company with over-all responsibility for the Electronic, Atomic and Defense Systems Group. Mr. LaPierre's headquarters are in New York City. A native of Jackson, Mo., he attended the University of Missouri's School of Engineering, and subsequently joined the staff of the General Electric General Engineering Laboratory at Schenectady, N. Y., in 1924.

In 1936, Mr. LaPierre was placed in charge of the Electromechanical Division of the Laboratory, and a year later received his Company's highest honor, the Charles A. Coffin Award. In May, 1949, he became assistant general manager of the Aircraft Gas Turbine Division. In November, 1949, he was named general manager. In December, 1952, Mr. LaPierre was elected a vice president of the Company. In November, 1954, he was appointed to head the Atomic Energy and Defense Products Group, which in November, 1955, was re-formed and redesignated the Electronic, Atomic, and Defense Systems group. Mr. LaPierre is a member of the Academy of Political Sciences, AIEE, ASME, SAE, Institute of the Aeronautical Sciences, and Eta Kappa Nu.

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MILL PRODUCTS—Up-to-date information on Kaiser Aluminum mill product availabilities has been published in booklet form by Kaiser Aluminum & Chemical Sales, Inc. In addition to giving a complete listing and description of availabilities, the 24-page brochure offers useful data on aluminum characteristics, fabricating and finishing techniques, mechanical and physical properties of alloys, and company services to customers. Kaiser Aluminum mill products include sheet, plate, foil, circles, casting alloys, pig, alloy ingot, rod, bar, wire, electrical conductor, forgings, extrusions, extrusion billet, roofing, siding and ShadeScreen. The 1958 edition of the mill product availabilities booklet may be obtained from Kaiser Aluminum & Chemical Sales, Inc., Dept. NR-4, 919 North Michigan Ave., Chicago 11, Ill.

—AE—

OPTICS—The new Bausch & Lomb Optical Parts Catalog L-117 makes it easy for you to describe your optical needs. The catalog contains information on a full line of unmounted optical parts, including lenses, prisms and reflectors. A special section describes quartz and other special optical parts. Each section contains detailed tables for ease and convenience in ordering stock items by catalog number. In addition, the catalog includes several revised outlines, written in non-technical language, which makes it a simplified procedure for research and manufacturing engineers and purchasing agents to describe their optical problems accurately and completely. A new price list is included with the catalog. Write for Catalog L-117 to Bausch & Lomb Optical Co., Rochester 2, N. Y.

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PIPE PILES—Comprehensive information on Foster's Taylor Forge spiral-weld foundation pipe piles is presented in a 24-page booklet offered by L. B. Foster Company. In addition to detailed specifications, the photo-illustrated booklet describes a number of pipe-pile installations and includes typical driving logs. A special feature of the new booklet is a table giving complete specifications of all popular pile hammers, including new diesels. It lists the make, type, style, energy, blows per minute, weights and dimensions. For a copy of this booklet, write to L. B. Foster Company, P. O. Box 1647, Pittsburgh 30, Pa.

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—AE—

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INSTRUMENTS—A catalog and price list of Path Engineering Instruments, made in Japan for Precision Instruments Inc., is now available. Bulletin 100-PI describes in detail the transits and levels now available to the American surveyor, contractor and builder through the Troy, N. Y., firm. Among the Path instruments included are a 6-inch "T" transit (1 minute, 20 seconds) with carrying case and tripod; a 5-inch "T" transit (1 minute) with carrying case and tripod; a 4-inch "T" transit (1 minute) with carrying case and tripod; an 18-inch Dumpy level and 15-inch and 12-inch Wye levels, all three with tripods and carrying cases; a tilting lever; a transit level; and a pocket transit. The Path instruments are one of a number of instrument lines carried by Precision Instruments Inc. For further information on the Path line, ask for Bulletin 100-PI. Address: Precision Instruments Inc., 1900 Fifth Ave., Troy, N. Y.

—AE—

CURING AGENT—A two-page, two-color data sheet describing the application of Emeri-Crete Kure on new and old concrete floors is now available from Walter Maguire Company, Inc., New York, N. Y. How Emeri-Crete Kure dustproofs and rejuvenates old floors is discussed as well as its effectiveness as both a curing agent and surface hardener on new cement floors. Specifications for applying to new and old floor surfaces are described. Performance figures showing water retention, coverage and penetration are included. Time and cost factors are also discussed. For copies of the Emeri-Crete Kure data sheet, write to Walter Maguire Company, 60 East 42nd St., New York 17, N. Y.

—AE—

CONCRETE TESTER—A six-page bulletin on concrete testing machines and accessory equipment has been issued by Soiltest, Inc., 4711 W. North Ave., Chicago 39, Ill. Illustrated and described are a wide range of portable and laboratory testing machines for testing concrete cylinders, blocks, beams and similar construction materials. The machines range in capacity from 200,000 pounds to 400,000 pounds. Concrete cylinder capping devices, curing cans, slump cones, cylinder molds, air entrainment meters and electric pump attachments are also shown in the new bulletin. The Soiltest CT-711 200,000 pound capacity hand operated portable concrete testing machine is also described.

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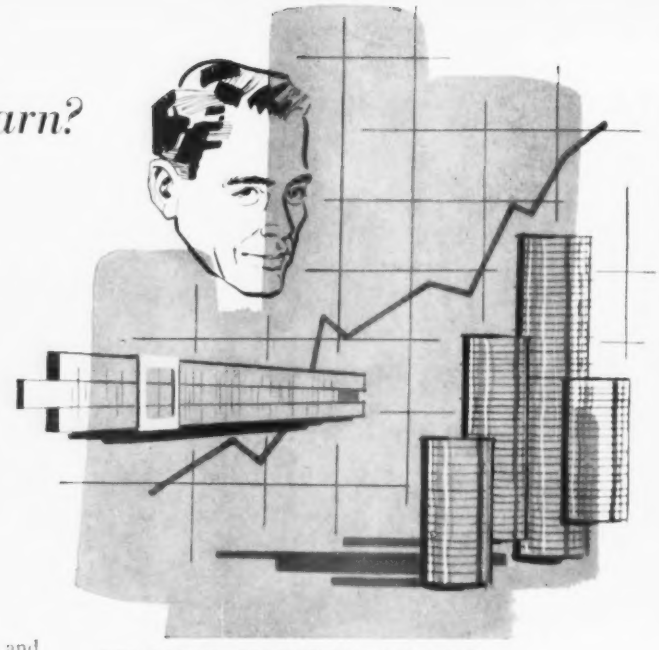
what do engineers earn?

PROFESSIONAL ENGINEERS INCOME & SALARY SURVEY—1956



Here is the latest in a continuing series of Income and Salary Surveys of the engineering profession made by the National Society of Professional Engineers. Started in 1952, the Surveys are part of a long-range income and salary study program. This third biennial Survey presents up-to-date information gathered from engineers throughout the country, in all the engineering fields. The Survey gives a detailed picture of engineer earnings by year of entry into the profession, by geographical region, by type of employer, by engineering specialty—and by a variety of other categories. Salary and income data from more than 17,000 registered, professional engineers were studied for this newest Survey report. Published in handy booklet form, the Survey provides a documented study at all levels of professional experience. Comparative earning figures from the 1952 and 1954 Surveys make it possible to evaluate broad engineering income and salary trends for the period 1952-56. A vital research study for engineers, industrial executives, personnel officers, and all others who want the facts on engineer earnings.

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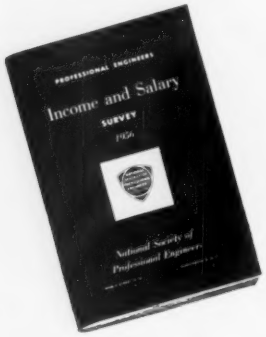

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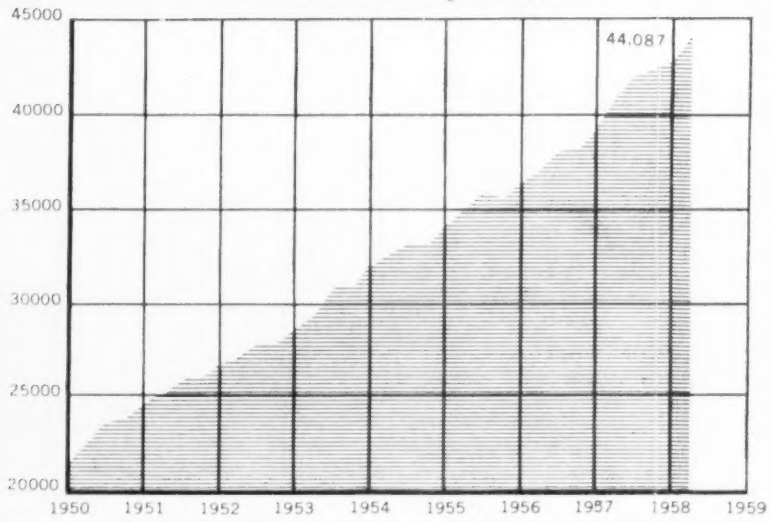

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U. C. L. A.

(Continued from page 22)

His attitude was seconded by the other sophomores, who added a suggestion for more emphasis on instruction by experts and less time for general classroom discussion.

The sternest evaluation of the success of a self-supporting educational program, as the EEP, comes once a year when the screening committee counts the number of applications. Despite the cost in money, time and intense effort, the stream of applications has widened every year and there are now several hundred applications for the thirty or so annual class openings. A number of students, who have failed to meet the academic requirements, have not hesitated to take one to two years of remedial work, merely to qualify for the program.

And those who have graduated think highly enough of the future of the program to have formed an alumni association to retain the contacts of their two years' studies and to give their support to the EEP in the years to come.—**End.**

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LETTERS

(Continued from page 5)

good for the engineering profession alone." and the aim of our Society is to take an interest in public affairs. Aim No. One is: "The advancement of the Public Welfare."

To slap at the "private profit-taking monopoly" is a reckless statement. The private power companies are the millions of their stockholders.

The private power companies are already burdened with controls, regulations and taxes.

1: The Federal Power Commission has to approve all projects.

2: Private power companies can only get a fifty years' license when the water powers are then returned to the people (government).

3: The state public service commissions regulate and control what prices can be charged to the public.

4: Private power companies must pay for the franchises before they can sell power to the public.

5: The national and state and local taxes paid by the private power companies are up to close to 25 per cent of their incomes.

Mr. Berry's words of "full development for the benefit of all the people" is a bit ridiculous. Whether the Government Army engineers or the Idaho Power Co. build it, it will be a full development for the benefit of the people, but not *all* the people, but only for the benefit of the people of *Idaho*. As for the *full* development, look at the facts.

The Hells Canyon project comprises two schemes:

1: To have the Army engineers build one very large dam to get 720 feet head and install 688,000 k.w. to cost $360,000,000.00, or

2: To have the Idaho Power Co. build in the same area three dams:
   a: Brownlee Dam for 277 feet head and 360,000 k.w. installed
   b: Oxbow Dam for 115 feet head and 151,000 k.w. installed
   c: Hells Canyon Dam for 208 feet head and 272,000 k.w. installed

(Cost to be a total of only $130,050,000.00 for 783,000 k.w. installed.)

The Idaho Power Company spends that $130,050,000.00 without any cost to any citizen and under a license for fifty years at which time the Government gets the plant back and then the Idaho Power Co. pays each year a very high tax. . . . If the Government built the plant every citizen in the nation must pay taxes to build it and yet only Idaho citizens get the benefits.

If the Idaho Power Co. builds it we will get nearly fifteen per cent more power production for a cost of only about one-third of what is would cost if the government built it.

Be it known that the decision to have the Idaho Power Co. build the project, is that of the Federal Power Commission after full investigation on their part and other Government agencies who listened to the complaints by the public power boys. The Federal Power Commission should be complimented for their excellent decision. . . .

H. H. White, P.E.
Atlanta, Ga.

Titles & Unity

Dear Editor:

Our policy (i.e. NSPE's) statement on "Engineering Titles" appears to me to be in a sense the best basis for membership criteria in our society which may satisfy the "AIEE" or "Coover Plan" for cooperation. I recommend that our Society consider the following grades:

1) Engineer

a) Graduation from an accredited engineering curriculum leading to a bachelor's degree.

b) Engineer-in-Training registration from any state board under a state engineering registration law.

c) Official ruling under Taft-Hartley Act.

2) Professional Engineer

Registration as a professional engineer under a state engineering registration law.

In addition to our policy statement, we should add the following grade:

3) Doctor

a) A Ph.D. degree in engineering or science from an accredited engineering college plus ten (10) years of eminence in the field of engineering.

b) An honorary Ph.D. degree in engineering or science from an accredited engineering college plus registration as a professional engineer under a state registration act.

4) All others not coming under any one of the categories listed in the policy statement or Engineering Titles will be allowed to be Functional Group members of those groups that best correspond to their Founder Society designation, but they must first be a member in any grade of one of the following Founder Societies: AIEE, ASCE, ASME, AIM & ME, and AIChE.

The first three grades mentioned above, i.e., Engineer, Professional Engineer, and Doctor, are to have full voting rights and all constitutional privileges. The fourth grade is to have only those constitutional rights now delegated to Functional Groups by NSPE.

I believe that this proposal will not lower in any way the high standards NSPE has set for its membership, and still will give those non-registered engineers the representation they desire. Also, the incentive for registration as a key in professional development of the individual as well as a legal requirement will not have changed. Also, the title 'Engineer-in-Training' may be dropped in time by state boards and the titles 'Engineer' and 'Professional Engineer' become more in custom.

Americo Lazzari, P.E.
Phoenix, Arizona

War . . .

Dear Editor:

In reference to the very fine article on the "Engineer Versus War" by Mr. Howard G. Kurtz, Jr., (September, 1957, AE) I feel that one very important factor has not received the consideration that is due. True, armaments are a vital factor, but men with fists and clubs are armed, and have fought wars while so armed. The neglected factor (in the article) is the mention of a Xerxes, a Ptolemy, an Alexander, Caesar, Napoleon, Hitler or similar ambitious dictators in absolute control of the arms and resources of a national group. When two strong nations are each headed by such ambitious politician, a war is inevitable.

Gay E. Miller, P.E.
Lt. Col., USA Ret.
Jefferson City, Mo.

Illinois Society of Professional Engineers—Annual Meeting, April 10-12, 1958, Orlando Hotel, Decatur, Illinois.

Massachusetts Society of Professional Engineers—Annual Meeting, April 12, 1958, Thompson Club, Nahant, Massachusetts.

Florida Engineering Society—Annual Meeting, April 23-26, 1958, Hotel Tampa Terrace, Tampa, Florida.

New Jersey Society of Professional Engineers—Annual Meeting, April 25-26, 1958, Ambassador Hotel, Atlantic City, New Jersey.

Montana Society of Professional Engineers—Annual Meeting, April 26, 1958, Finlen Hotel, Butte, Montana.

New York State Society of Professional Engineers—Annual Meeting, May 8-10, 1958, Statler Hotel, New York, New York.

Pennsylvania Society of Professional Engineers—Annual Meeting, May 8-10, 1958, Abraham Lincoln Hotel, Reading, Pennsylvania.

Maryland Society of Professional Engineers—Annual Meeting, May 13, 1958, Friendship International Airport, Baltimore, Maryland.

California Society of Professional Engineers—Annual Meeting, May 22-24, 1958, Lafayette Hotel, San Diego, California.

Indiana Society of Professional Engineers—Annual Meeting, May 23-24, 1958, Deming Hotel, Terre Haute, Indiana.

District of Columbia Society of Professional Engineers—Annual Meeting, May 26, 1958, Washington Hotel, Washington, D. C.

NSPE Annual Meeting—June 11-14, 1958, Chase-Park Plaza Hotels, St. Louis, Missouri.

STRICTLY BUSINESS

Personalities . . . The promotion of **William M. Day** and **Gordon N. Gray** to vice presidents of **Bryant Manufacturing Company,** Indianapolis, Ind., a division of **Carrier Corporation,** has been announced by **Samuel F. Shawhan,** president . . . **W. J. Brown** has been appointed staff production application engineer in the Marketing Service Division of the **Gulf Research & Development Company,** research subsidiary of the **Gulf Oil Corporation.** He will be headquartered at the Research Center at Harmarville, Pa. . . . **John R. Scholl** has been named chief engineer of **Gould-National Batteries, Inc.,** Nicad Division, Easthampton, Mass. . . . **Dr. Ta Liang** has joined the consultants' staff of **Aero Service Corporation,** Philadelphia, Pa., and its affiliate companies . . . The appointment of **Gordon K. Ray** as manager of the Highways and Municipal Bureau of the **Portland Cement Association** has been announced by **George H. Paris,** director of promotion planning and engineering services. He succeeds **Leo Arms,** who has been named technical adviser, Highways and Municipal Bureau . . . **Lawrence E. Miller** has been named a vice president in the **Leo A. Daly Company,** of Omaha, Neb. . . . **John M. Marburger, Jr.,** has been appointed administrator of the **Prince Georges County (Md.) Public Works Department.**

Mr. Day

Herbert D. Oliver has retired as district manager of **Raymond Concrete Pile Company's** Atlanta office. **Hershel B. Miller** has succeeded **Mr. Oliver** . . . Four engineers have recently joined the staff of **Clevite Transistor Products,** Waltham, Mass. They are **William Dingsdale, John Hill, William L. Quine,** and **David E. Roberts** . . . The appointment of **J. E. (Jap) Massey** as chief engineer **of Delta Tank Manufacturing Co., Inc.,** with headquarters in Baton Rouge, La., has been announced by **Hal S. Phillips,** president . . . **Hermand T. Johnson** has been appointed chief of the Civil Engineering Department at the **U.S. Army Engineer Research and Development Laboratories,** Fort Belvoir, Va. . . . **Edwin S. Dawson,** vice president in charge of engineering and manufacturing, has retired after thirty-five years' association with **The Deming Company,** Salem, Ohio . . . The **M. W. Kellogg Company,** New York, N. Y., a subsidiary of **Pullman, Incorporated,** announces the appointment of **J. A. Crowley** as manager of administrative engineering . . . **Robert S. Root** has been named chief engineer of both Clutch Division and Machine Tool Division of **Lipe-Rollway Corporation,** Syracuse, N. Y. . . . **Dr. Miro A. Grottger** has joined **Industrial Finishes Company,** Philadelphia, Pa., as vice president and director of research, it has been announced by **John F. Howe,** president . . . The appointment of **L. William Kates** as director of engineering of **Sylvania-Corning Nuclear Corporation,** Bayside, L. I., has been announced.

Mr. Massey

Johannes G. Schaberg has joined **Control Data Corporation** as a staff engineer of its Cedar Engineering Division . . . **John R. Smyth** has been named to the newly-created post of assistant director of engineering at **Exide Industrial Division** of **The Electric Storage Battery Company,** Philadelphia, Pa. . . . **William J. Grady** has been appointed manager of construction for **Burns and Roe, Inc.,** New York, N. Y. . . . **Harry B. Burrack** has been appointed technical superintendent of the **Olin Aluminum Division** Rolling Mill of **Olin Mathieson Chemical Corporation.** The Mill is located between Clarington and Hannibal, Ohio . . . **Jules P. Kovacs,** vice president in charge of research and development of **Purolator Products, Inc.,** Rahway, N. J., has been given the expanded responsibilities of new product marketing and special engineering services . . . **John E. Jacobs** has been appointed general manager of the Lackawanna, N. Y., plant of **Bethlehem Steel Company. Floyd S. Eckhardt,** chief engineer of the plant, was appointed to succeed **Mr. Jacobs** as an assistant general manager. **Richard N. Hurd** was promoted to chief engineer . . . **A. R. Teasdale** has been named to the newly-created post of director of advanced technology at **Temco Aircraft Corporation,** Dallas, Tex. **Frank P. Florentine** has been appointed manager of the Phenolics Engineering Unit of **General Electric's** Chemical Materials Department at Pittsfield, Mass. . . . The appointment of **Leslie C. Overlock** as national sales manager of **American Photocopy Equipment Company,** Chicago, Ill., has been announced . . . **Charles H. Jackson** has been added to the staff of the Electronics Department of **Hamilton Standard,** Broad Brook, Conn., as a project engineer in the Advanced Design Group . . . The appointments of **Charles H. Williams** as administrative vice president-engineering and **James B. Austin** as administrative vice president-research and technology has been announced by the **United States Steel Corporation.**

Mr. Grady

New Firms . . . **Alex C. Burr** announces the opening of an office at Jamestown, N. Dak., as a consulting engineer . . . **Daniel Koffler and Associates** have opened an office for the practice of structural, mechanical, and sanitary engineering. The office is located at New Castle, Del.

Partnerships . . . **Johannessen & Girand, Consulting Engineers,** of Phoenix, Ariz., have announced the election of the following to firm partnership: **Frank W. Bromley, William N. Woodruff,** and **Robert L. Norton** . . . The partnership of **Rebmann & Gay** has been expanded into the partnership of **Rebmann Gay Herold, Consulting Engineers,** of St. Louis, Mo. **Mr. Herold** joins with **Charles P. Rebmann** and **Clarence E. Gay, Jr.,** in this expansion.

What's New

This column describes new products of general interest to professional engineers. For further information, circle the item number on opposite page and mail to the AMERICAN ENGINEER.

These listings are informational and are not an endorsement of the products, nor of the manufacturer's claims.

POWERFUL DOZER — Item 30

Clark Equipment Company announces the availability of a powerful production model dozer—its new 600 horsepower, 104,000 pound working weight "Michigan" Model 480 rubber-tired unit. Nearly 27 feet long, 14 feet wide and 11 feet, 8 inches high, the Model 480 has a top speed of 28 miles per hour, both forward and reverse. It is powered by a 12-cylinder Cummins turbocharged diesel engine.

POWDERED CLEANER — Item 31

A cleaning compound for trays and paper guides of office photocopy machines—in dry powder form which is easier to store and less expensive to ship than liquid cleaners—has been introduced by Peerless Photo Products, Inc. Users of photocopy machines will get sharp, stain-free photocopies and trouble-free machine performance, Peerless claims. The new "Dri-Stat" tray cleaner is non-toxic and can be readily dissolved in tap water.

DYNA-SWITCH — Item 32

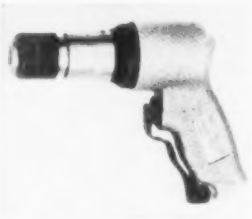
Development of a new Dyna-Switch for the automatic prevention of hoist and crane overloading has been announced. The new model features a lifting hook at the bottom, rather than the normal lifting eye. This hook, which offers a generous throat opening, will accommodate almost any hoist or crane. Thus, the new model provides greater utility, as well as ease and speed of loading and unloading.

ENGINE SLIDE RULE — Item 33

Seventy pounds of diesel and natural gas engine catalogs and specification sheets have been referenced, digested and the pertinent information placed on a special computer. This time-saving instrument gives rating and application characteristics of all diesel and natural gas engines manufactured in the United States. Packaged in a convenient carrying case on which are printed the complete operating instructions, this 10" diameter instrument fits easily in a brief case.

AIR HAMMER — Item 34

A heavy duty air hammer, the Model SP-600, featuring a short barrel for easier operation in blind spots or close quarters, has been announced. The Model SP-600 weighs 3 lbs., is only 8" long, and is easy to handle. It has a metering trigger that lets the operator control blows from 0 to 3500 per minute with just light pressure from one finger. A patented safety chuck locks tools in six different positions.



SPRAY EQUIPMENT — Item 35

Development of spray equipment for cooling and lubricating forming and cutting tools for metal and plastics has been announced by The DeVilbiss Company. Called Multi-Mister, the equipment is designed for use with any cutting tool to supply a fine mist of coolant liquids or light cutting oils at the point of contact between the tool and the material. The company states that the Multi-Mister will increase tool life, produce better finishes, save coolant material, and make chips cleaner and easier to handle.

FLOOR PATCH — Item 36

A quick-drying, fast-setting floor patch and crack filler is now available. Known as Filmix, this scientifically-formulated, powdered plastic compound dries hard in one to two hours with minimum shrinkage. Advantages over previously available compounds include greater trowelability, improved modulus of rupture, and as much as 40 per cent greater resistance to indentation, it is claimed.

CYLINDER CARRIER — Item 37

A new type of concrete cylinder carrier has been introduced. The Bristol Carrier makes it possible for the engineer or technician to carry two concrete cylinders in the field or in the laboratory with safety, using a minimum of effort. The lightweight carriers are designed so that the mold in which the concrete cylinder has been formed can be carried immediately after being filled and without injury to the samples.

American Engineer

PROFESSIONAL ENGINEER...

Are you busy? . . . Need more information?

Keeping up-to-date on new products and new developments is a "must" for the registered, professional engineer. With this thought in mind, the AMERICAN ENGINEER recently initiated a READERS' SERVICE DEPARTMENT for its more than 46,000 readers—and the response has been overwhelming!

WHAT'S THE STORY?

The story is just this: to take advantage of our READERS' SERVICE DEPARTMENT you must first read the advertisements in this issue and note that each ad makes reference to a number on the coupon below. If you want more information about any product simply circle the corresponding number on the handy coupon—and MAIL TODAY! We will forward your requests to the advertiser and the information will then be sent *directly to you*. It's easy, try it.

A boon to the busy engineer!

AMERICAN ENGINEER
2029 K Street, N.W.
Washington 6, D. C.

APRIL, 1958

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"Every effort we put into the SAVINGS BOND PROGRAM will be richly rewarded..."

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"America's great productivity has been made possible by the willingness of Americans to save a part of their incomes for investment in productive enterprises. The Payroll Savings Plan of the Savings Bond Program implants and helps to sustain the habit of regular savings, and this benefits our whole economy as well as each individual saver.

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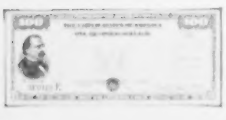

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